SEPTEMBER 1985
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POPULAR COMPUTING

Improving Productivity for Managers and Professionals

THE NEW 286 GENERATION

Three Powerful 80286-based PCs Mean Business: Compaq 286

TI Business Pro

Kaypro 286i

Software Reviews: MacLion & Helix: Top-of-the-Line Mac Databases

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Special Report: The Best Way To Back Up Your Hard Disk Data

— PLUS —

Buyer's Guide To Backup Systems

How To Send Your Data To Any Micro

Software For Simplifying Management Chores

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Inquiry 33

September 1985 Volume 4/Number 11

POPULAR COMPUTING

Improving Productivity for Managers and Professionals

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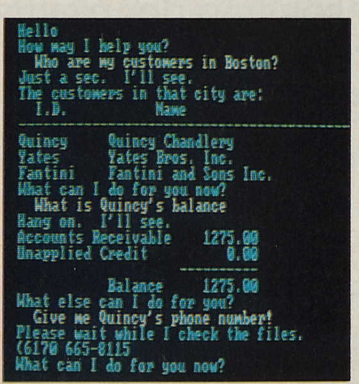

```
Hello
How may I help you?
  Who are my customers in Boston?
Just a sec.  I'll see.
The customers in that city are:
  I.D.            Name
----------------------------------------
Quincy     Quincy Chandlery
Yates      Yates Bros. Inc.
Fantini    Fantini and Sons Inc.
What can I do for you now?
  What is Quincy's balance
Hang on.  I'll see.
Accounts Receivable    1275.00
Unapplied Credit          0.00
                     ----------
           Balance     1275.00
What else can I do for you?
  Give me Quincy's phone number!
Please wait while I check the files.
(6170 665-8115
What can I do for you now?
```

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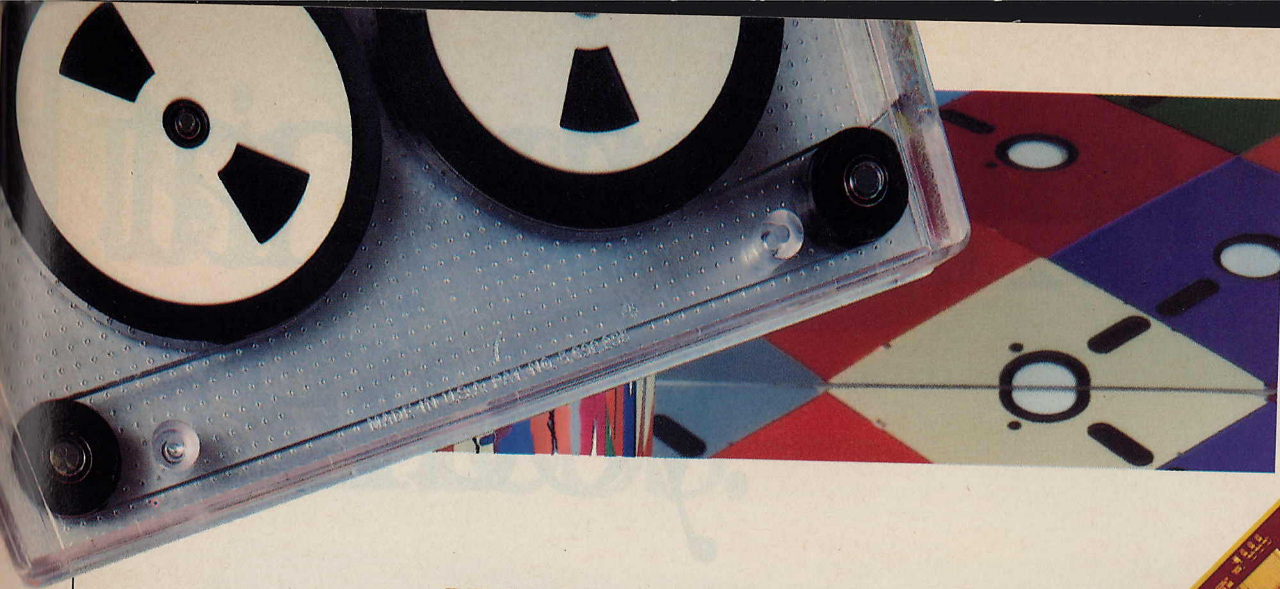

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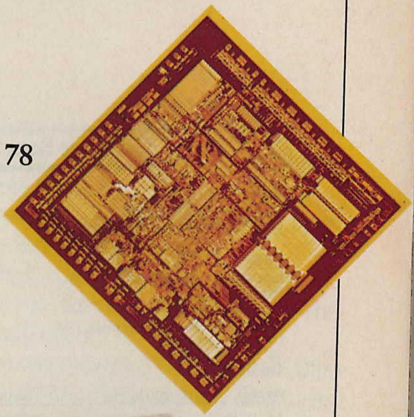

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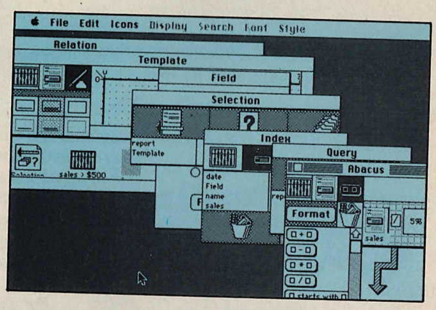

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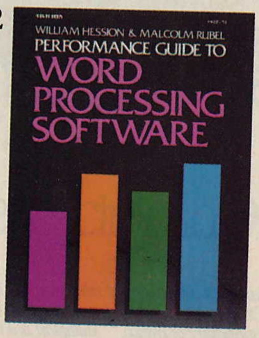

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WORD PROCESSING SOFTWARE

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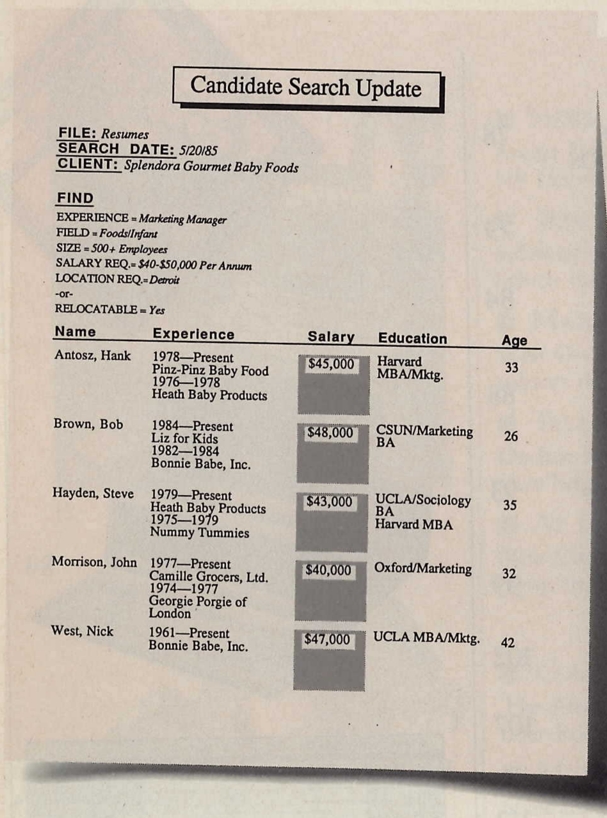
you're in



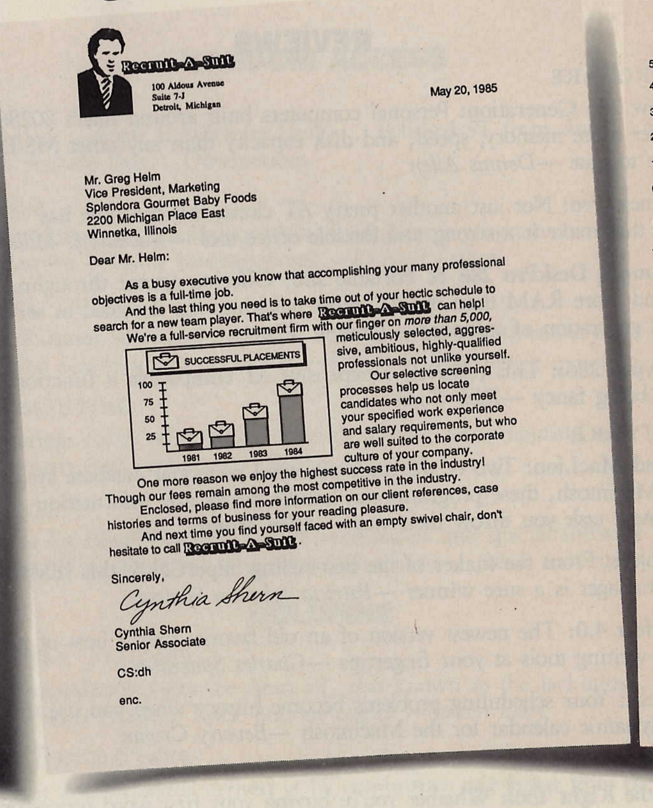
Candidate Search Update

FILE: *Resumes*
SEARCH DATE: *5/20/85*
CLIENT: *Splendora Gourmet Baby Foods*

FIND

EXPERIENCE = *Marketing Manager*
FIELD = *Foods/Infant*
SIZE = *500+ Employees*
SALARY REQ.= *$40-$50,000 Per Annum*
LOCATION REQ.= *Detroit*
-or-
RELOCATABLE = *Yes*

Name	Experience	Salary	Education	Age
Antosz, Hank	1978—Present Pinz-Pinz Baby Food 1976—1978 Heath Baby Products	$45,000	Harvard MBA/Mktg.	33
Brown, Bob	1984—Present Liz for Kids 1982—1984 Bonnie Babe, Inc.	$48,000	CSUN/Marketing BA	26
Hayden, Steve	1979—Present Heath Baby Products 1975—1979 Nummy Tummies	$43,000	UCLA/Sociology BA Harvard MBA	35
Morrison, John	1977—Present Camille Grocers, Ltd. 1974—1977 Georgie Porgie of London	$40,000	Oxford/Marketing	32
West, Nick	1961—Present Bonnie Babe, Inc.	$47,000	UCLA MBA/Mktg.	42



Recruit-A-Suit
100 Aldous Avenue
Suite 7-J
Detroit, Michigan

May 20, 1985

Mr. Greg Helm
Vice President, Marketing
Splendora Gourmet Baby Foods
2200 Michigan Place East
Winnetka, Illinois

Dear Mr. Helm:

As a busy executive you know that accomplishing your many professional objectives is a full-time job.

And the last thing you need is to take time out of your hectic schedule to search for a new team player. That's where Recruit-A-Suit can help!

We're a full-service recruitment firm with our finger on *more than 5,000,* meticulously selected, aggressive, ambitious, highly-qualified professionals not unlike yourself.

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Enclosed, please find more information on our client references, case histories and terms of business for your reading pleasure.

And next time you find yourself faced with an empty swivel chair, don't hesitate to call Recruit-A-Suit.

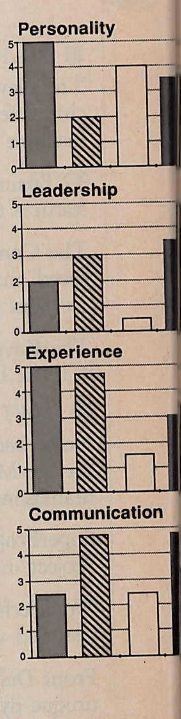
Sincerely,

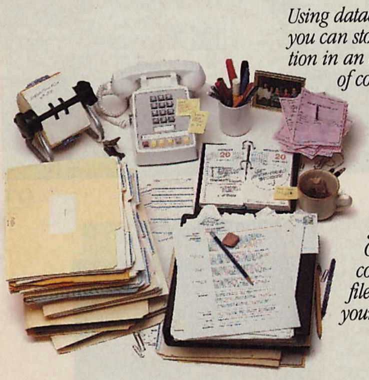
Cynthia Shern

Cynthia Shern
Senior Associate

CS:dh

enc.





Using database management programs you can store, retrieve and sort information in an almost unlimited number of combinations. As opposed to the way you're probably doing it now. Above, we've located eligible candidates by salary and work experience. But database management is also handy for things like generating master mailing lists. Creating invoices. Sorting by zip code. Checking inventory. No files to lose. No cross-referencing your Rolodex.® No paperclips.

In business, people often meet your letterhead before they meet you. Ever wondered what a typewritten page stiff with white-out says about your business? With The Macintosh Office you can even design and print your own letterhead, plus combine publication quality text and graphics for a lasting first impression. More important, you can send personalized letters to as many prospects as you have paper.

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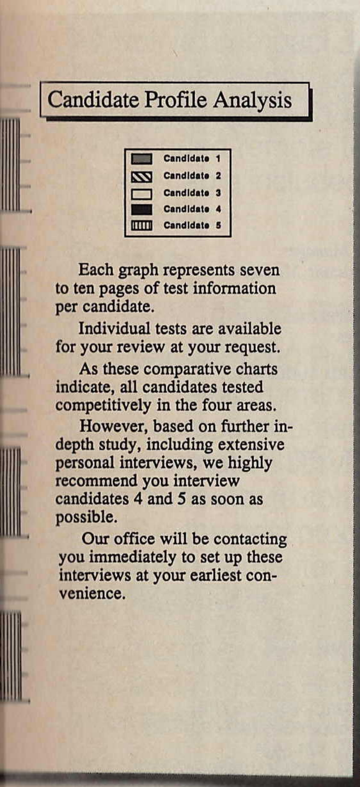


Candidate Profile Analysis

▩	Candidate 1
▨	Candidate 2
☐	Candidate 3
■	Candidate 4
▥	Candidate 5

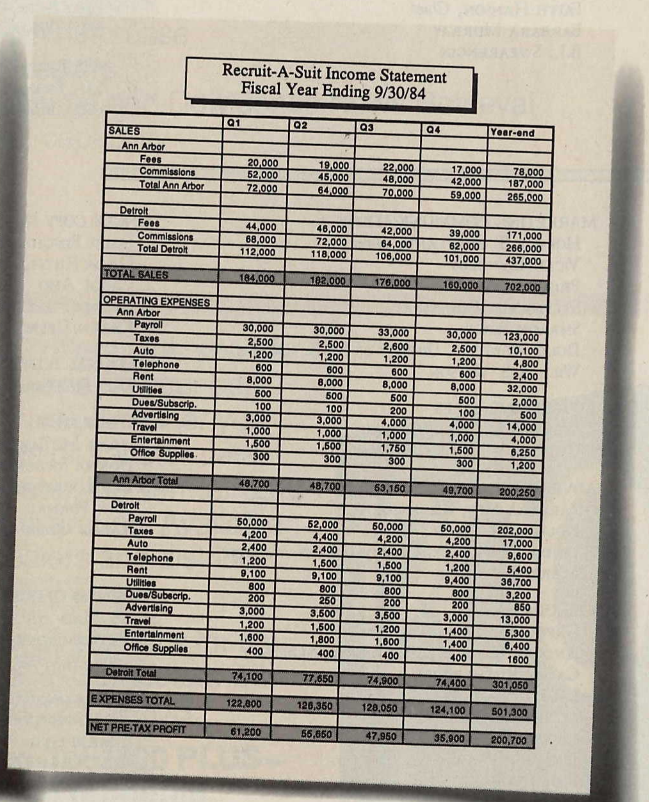
Each graph represents seven to ten pages of test information per candidate.

Individual tests are available for your review at your request.

As these comparative charts indicate, all candidates tested competitively in the four areas.

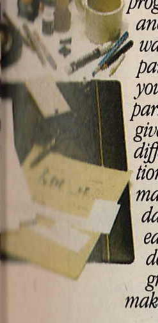
However, based on further in-depth study, including extensive personal interviews, we highly recommend you interview candidates 4 and 5 as soon as possible.

Our office will be contacting you immediately to set up these interviews at your earliest convenience.



Recruit-A-Suit Income Statement
Fiscal Year Ending 9/30/84

	Q1	Q2	Q3	Q4	Year-end
SALES					
Ann Arbor					
Fees	20,000	19,000	22,000	17,000	78,000
Commissions	52,000	45,000	48,000	42,000	187,000
Total Ann Arbor	72,000	64,000	70,000	59,000	265,000
Detroit					
Fees	44,000	46,000	42,000	39,000	171,000
Commissions	68,000	72,000	64,000	62,000	266,000
Total Detroit	112,000	118,000	106,000	101,000	437,000
TOTAL SALES	184,000	182,000	176,000	160,000	702,000
OPERATING EXPENSES					
Ann Arbor					
Payroll	30,000	30,000	33,000	30,000	123,000
Taxes	2,500	2,500	2,600	2,500	10,100
Auto	1,200	1,200	1,200	1,200	4,800
Telephone	600	600	600	600	2,400
Rent	8,000	8,000	8,000	8,000	32,000
Utilities	500	500	500	500	2,000
Dues/Subscrip.	100	100	200	100	500
Advertising	3,000	3,000	4,000	4,000	14,000
Travel	1,000	1,000	1,000	1,000	4,000
Entertainment	1,500	1,500	1,750	1,500	6,250
Office Supplies	300	300	300	300	1,200
Ann Arbor Total	48,700	48,700	53,150	49,700	200,250
Detroit					
Payroll	50,000	52,000	50,000	50,000	202,000
Taxes	4,200	4,400	4,200	4,200	17,000
Auto	2,400	2,400	2,400	2,400	9,600
Telephone	1,200	1,500	1,500	1,200	5,400
Rent	9,100	9,100	9,100	9,400	36,700
Utilities	800	800	800	800	3,200
Dues/Subscrip.	200	250	200	200	850
Advertising	3,000	3,500	3,500	3,000	13,000
Travel	1,200	1,500	1,200	1,400	5,300
Entertainment	1,600	1,800	1,600	1,400	6,400
Office Supplies	400	400	400	400	1600
Detroit Total	74,100	77,650	74,900	74,400	301,050
EXPENSES TOTAL	122,800	126,350	128,050	124,100	501,300
NET PRE-TAX PROFIT	61,200	55,650	47,950	35,900	200,700



If a picture is worth a thousand words, business graphics like these could cut meetings and presentations in half. We've taken information on five candidates stored in one software program, copied it into another program, where it was used to create these comparative bar graphs. Once your data is entered, this particular software program gives you your choice of 42 different graph configurations. You can preview your material (whether it's candidates, costs or cookies) in each configuration to decide which chart or graph most persuasively makes your point.

*As you well know, business involves innumerable number-related tasks, not the least of which is generating income and expense statements like this one. Should you want to change any of the entered items—to take a look at the effects of opening a new office or decreasing your staff—a spreadsheet program like Multiplan** will automatically recalculate the entire document. (Here, we've copied it into MacDraw™ and enhanced it for presentation purposes.) It not only saves hours of entering, double-checking and erasing, but when teamed up with our LaserWriter printer, it produces a printout impressive enough to show a bank president. Fast enough for this afternoon's meeting.*

Whether you're Nabisco® or Ms. Priss' Cookie Company you worry about the bottom line. Write letters. Keep track of inventory. Keep your overhead under control. Pay taxes. Retrieve files. Schedule projects.

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The cornerstone of The Macintosh Office is our Macintosh 512K computer. All you need to know about its powerful, 32-bit, mouse-driven technology is that it reduces the time it takes to become productive with a computer from well over a work week to just under a lunch hour.

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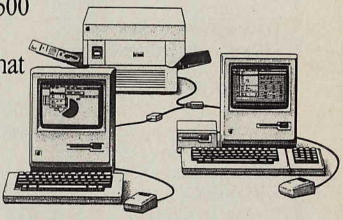

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Features	**Ven-Tel 1200 PLUS**	**Hayes**
1200 and 300 baud, auto-dial, auto-answer	Yes	Yes
Compatible with "AT" command set	Yes	Yes
Can be used with CROSSTALK-XVI or Smartcom II software	Yes	Yes
Regulated DC power pack for cool, reliable operation	Yes	**No**
Eight indicator lights to display modem status	Yes	Yes
Speaker to monitor call progress	Yes	Yes
Attractive, compact aluminum case	Yes	Yes
Two built-in phone connectors	Yes	**No**
Compatible with The Source and Dow Jones News Retrieval	Yes	Yes
Unattended remote test capability	Yes	**No**
Phone cable included	Yes	Yes
Availability	Now	
Price	**$499**	**$599**

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Inquiry 48

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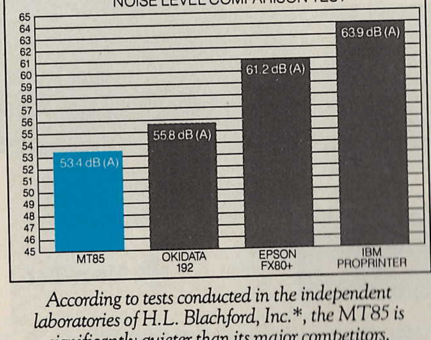

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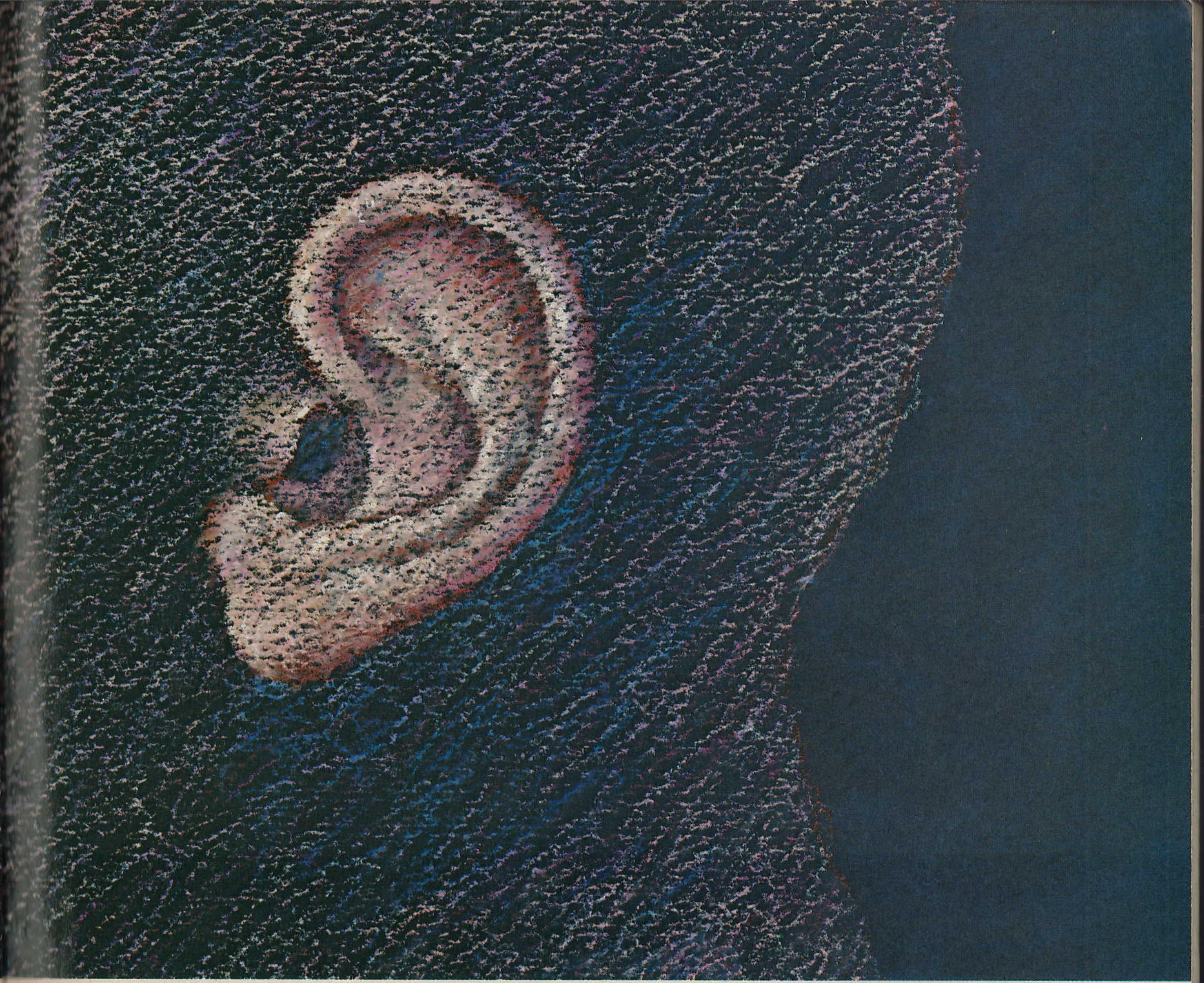

printers don't want you to hear.

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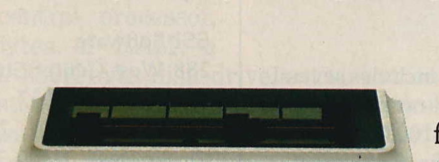

Mannesmann Tally MT85

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Inquiry 29

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NEWS

Amiga Unveiled

After months of rumors and speculation, Commodore International finally scheduled the formal introduction of its long-awaited Amiga computer for July 23 and planned to begin shipping the machine in mid-August.

In terms of technical sophistication, the Amiga PC lives up to much of its advanced billing. It provides phenomenal color, graphics, animation, sound, and multitasking capabilities on top of a user interface featuring bit-mapped graphics, windows, and icons. All this comes at a competitive price—$1295 for a basic unit including a 68000 central processor, 256K bytes of RAM, a 3½-inch, 880K-byte disk drive, a two-button mouse, standard RS-232 serial and Centronics-type parallel ports, and outputs for a television or RGB monitor. With a price tag of $1990, the Amiga PC comes bundled with a Toshiba 13-inch color monitor and an upgrade to 512K bytes of RAM.

Other standard features include a full-travel keyboard with typewriter layout, cursor keys, and numeric keypad; 192K bytes of ROM containing many of the graphics and animation routines; a connection for up to three external floppy-disk drives; a proprietary disk operating system called AmigaDOS; and Intuition, a Macintosh-like user interface.

Given the proper software, the Amiga can display graphics and animation that rival or exceed anything you've seen on a personal computer, and the machine can further enhance its animations with stereo sound. All this razzle-dazzle is made possible by three custom-designed chips that control graphics, animation, sound, and input/output. The graphics chip can display 32 colors (chosen from a palette of 4096) in standard resolutions and 16 at 640 by 400 dots. The animation chip handles much of the intensive processing in tasks such as redrawing the background image while a figure moves across the screen. The sound chip can synthesize both male and female voices and the sounds of musical instruments ranging from organs to high-energy electric guitars. It generates four channels of sound that are then sent to stereo outputs for an amplifier and speakers. In addition, this same chip controls all input and output operations.

In general, the three special chips work independently of the central processor, handling their dedicated tasks much more quickly than the 68000 would. Together with the concurrent-processing capabilities of the Amiga's system software, this means that the machine can perform true multitasking at speeds almost as fast as if you were running one application alone. You could, for a far-fetched example, play a graphics-intensive video game and listen to a synthesized opera in stereo

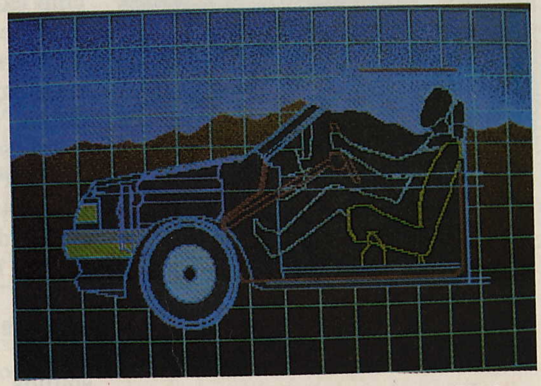
Photograph by Ken Skalski

while recalculating a large spreadsheet in the background.

The sophisticated operating system uses lots of memory, however, and much of it is taken from the RAM available to the user. In fact, the operating system loads in from disk and takes about half of the 256K bytes of RAM, leaving only 130K bytes for applications. The problem is that some powerful business programs require much more memory. Also, with so little user memory available in the standard machine, running just two typical business applications—such as a large spreadsheet and a word processor—would be impossible without a memory upgrade.

The basic 256K bytes of memory can be expanded to 512K bytes with Commodore's $195 user-installable option board. Further expansions could be linked to the 68000 bus (an external extension of the main circuit board's input/output functions), and Commodore is counting on third-party suppliers to offer additional memory expansion up to the 8 megabytes that the 68000 can address.

Tecmar, according to a spokesman for the well-known hard-disk supplier, plans to offer a multifunction module that attaches to the side of the Amiga and provides up to 1 megabyte of additional RAM. At press time, Tecmar was also working on a 20-megabyte hard disk (approximately $1000), a 20-megabyte tape backup ($500–$600), and, at least according to Commodore, a 2400-baud modem. Commodore itself plans to offer a musical instrument digital interface (MIDI), musical keyboard, color digitizer, and an interface for a laser disk or videocassette recorder.



The Amiga's custom graphics and animation chips make for dazzling screen displays.

Despite the Amiga PC's impressive features and attractive price, questions about whether available software will meet the needs of the intended market remain unanswered. Commodore seems to be aiming at the audience of Apple's Macintosh. The company says it will promote the Amiga with a $25 million media blitz during the first six months after it is launched, targeting the machine for serious users interested in small-business, home-business, and some vertical-market applications. On top of that, during the first half of 1986, Commodore will aim the Amiga at large corporations, educators, and a broader range of vertical markets.

Perhaps the biggest question mark about the Amiga, however, is its available software. The machine will come bundled with AmigaDOS, a tutorial program, a graphics demo called Kaleidoscope, and a proprietary version of BASIC. Commodore says it plans to sell a series of productivity programs available for less than $100 each. These include Textcraft, an entry-level word-processing program from Arktronics (which is also preparing a filing program); GraphicCraft, an introductory graphics program from Island Graphics; CalcCraft, a spreadsheet designed by Synapse; as well as TeleCraft (telecommunications) and MusicCraft.

Other Amiga software due this fall is designed for personal rather than business use. In the entertainment arena, Electronic Arts will provide a dozen new or enhanced games and graphics programs. SubLogic is working on a version of its popular Flight Simulator, and Infocom and Activision have also expressed interest in developing games for Amiga. Island Graphics will introduce two additional graphics programs and an animation package.

A couple of pure business programs should be available as well. By mid-August, Chang Laboratories plans to release the general-ledger portion of its Rags to Riches small-business accounting package (with the other modules scheduled for fall release). The Software Group will offer Enable/Write, the word-processing portion of its well-regarded Enable integrated software program, and Enable's spreadsheet, database, telecommunications, and graphics modules should be available by this fall. So far, however, none of the largest business software developers—including Lotus, Microsoft, Ashton-Tate, MicroPro, and Software Publishing—has announced business packages for the Amiga.

By the time the Amiga appears in stores, however, Commodore hopes to have a $450 IBM PC emulation package. This option should let users move data onto 3½-inch disks, use 5¼-inch disks for copy-protected programs, and run software designed for the IBM PC. Interestingly, the emulation does not involve adding an 8088 central processor to the Amiga but emulating that chip's instructions through the 68000 processor. Such an option might overcome some of the lack of business software, even though MS-DOS software would not be able to take advantage of any of the machine's special features.

In fact, although the company claims that about 20 programs designed for the Amiga PC will be available when the machine is, as of this writing only two are business applications. This lack of business software was underscored by reactions at a recent developer's conference attended by more than 100 software firms. Most came away convinced that the machine was technically superior, but many expressed concerns about its nonstandard operating system and questioned Commodore's ability to sell the machine to a business audience. Entertainment software developers are excited but business software vendors seem to be taking a wait-and-see approach.

Still, Commodore appears to be prepared to wait it out and is doing its best to attract the software developers it needs. Given its sophisticated capabilities, the Amiga PC is a machine to watch. □

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Inquiry 22

Introducing the

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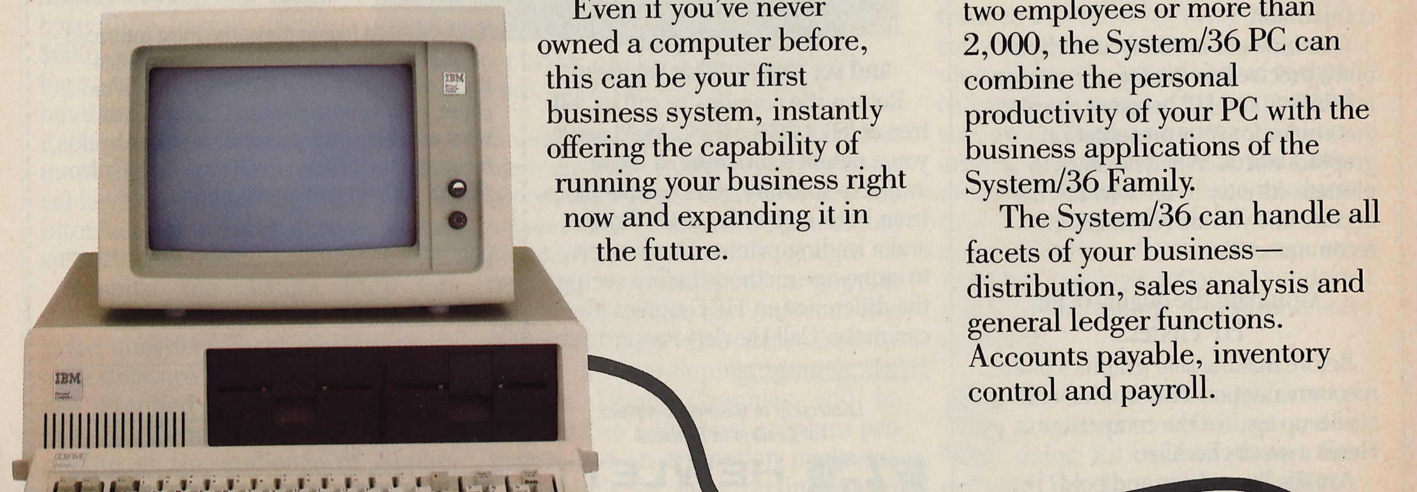

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IBM System/36 PC.

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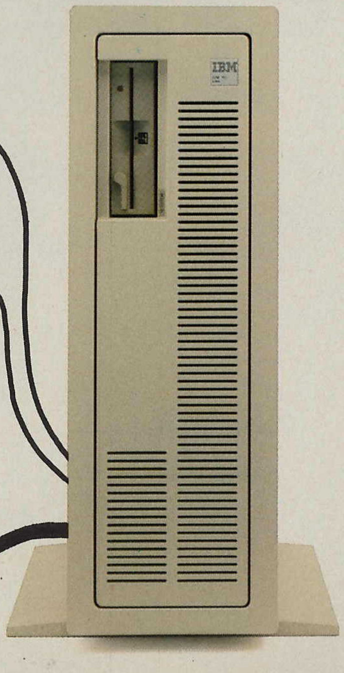

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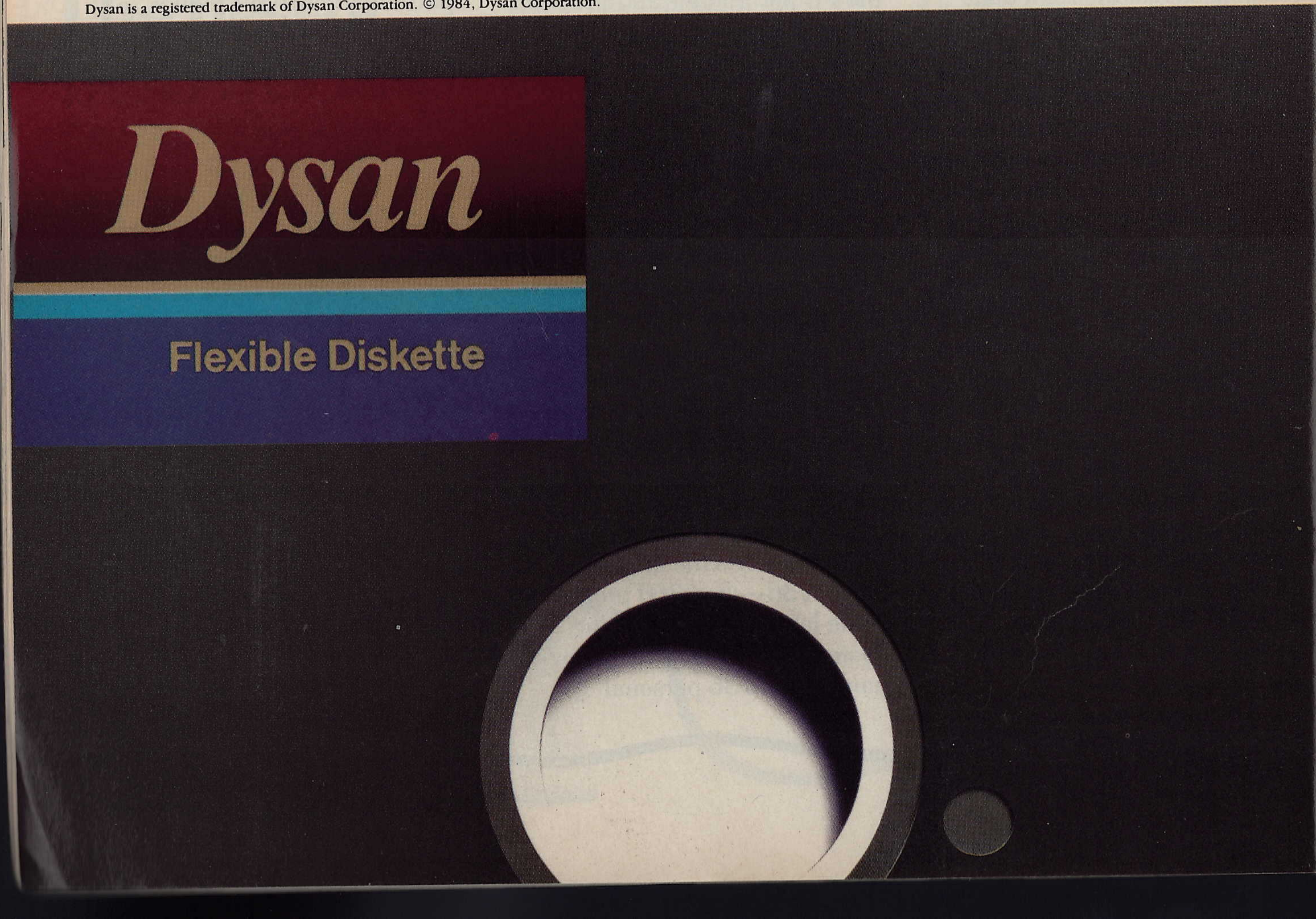

Apple II Software Unites

Perhaps spurred on by the phenomenal success of Appleworks, several vendors are rolling applications into single packages for the Apple II family.

Appleworks itself, a $250 program that includes word-processing, spreadsheet, and file management components, has become one of the best-selling application packages in the industry, but some software vendors have privately wondered whether Apple, with such a large market share, was hurting other suppliers of software for the machines. While IIc marketing manager Don Field admits that some may have suffered, he points out that all vendors of Apple II software have benefited from the greater number of machines sold and that some have profited by selling software that works with Appleworks.

For instance, the Advanced Business Accountant from Manzanita Software (Roseville, CA) hinges on Appleworks by producing spreadsheets and databases compatible with it. Similarly, Megahaus's Megaworks (San Diego, CA) adds mail merge and a spelling checker to Appleworks' word processor.

But some of those software firms with products that may compete with Appleworks are fighting back. Software Publishing Corp. is bundling its PFS:File, Report, and Write programs, along with a coupon for its PFS:Plan spreadsheet (due to be released in the fall), as a $250 package called PFS:Bestsellers for the Apple II family. Similarly, Stoneware is combining its $295 DB Master 4 database program with a new Business Writer word processor, which includes a mail merge feature that works with DB Master on the Apple II. Business Writer alone costs $149; the combination, called

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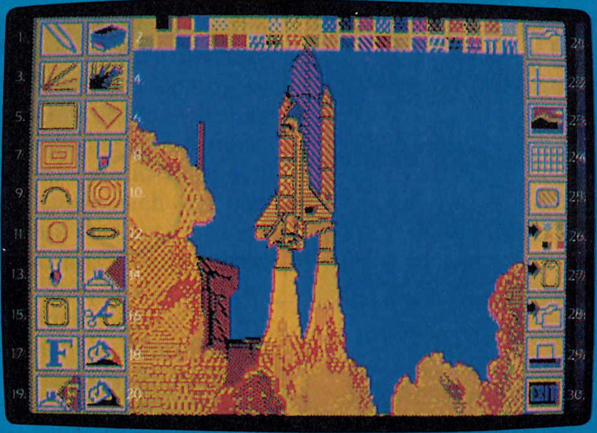

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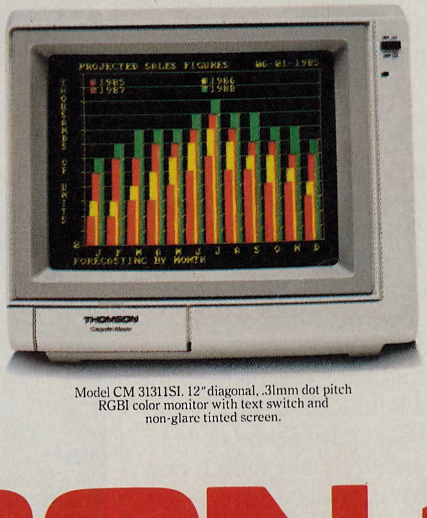

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Inquiry 47

Business Team, costs $329.

And for those with tight software budgets, Softsync Inc. (New York, NY) sells Trio—a combination of word-processing, spreadsheet, and filing applications—for less than $100. All of this activity centered in business productivity software indicates that while the IBM PC and Apple's Macintosh are getting most of the attention, plenty of Apple IIs are still doing the job for small businesses.

—MICHAEL J. MILLER

Polished ST from Atari

Hoping to convince others that the new Atari Corp. is for real, the firm used this summer's Consumer Electronics Show to unveil a less expensive version of its 68000-based ST computer. Atari backed up its news with the names of software vendors who will support the ST line and also showed an optical-disk storage device.

The new 260 ST, which carries a suggested list price of $499, has 256K bytes of RAM and a 3½-inch, 500K-byte disk drive. The previously-announced 520 ST offers 512K bytes of RAM, a monochrome monitor, and the disk drive for $799. Both machines include standard serial (RS-232) and MIDI (music) ports. Atari said it plans to market the 260 ST through mass-market retailers while selling the 520 ST through computer specialty stores.

Using Digital Research's Graphics Environment Manager (GEM) and a new operating system called TOS, the ST line will have a lot of speed and graphics ability for the price. GEM, which resembles the Macintosh's desktop but offers color, provides program developers and users with a standard, familiar interface for all applications.

The STs have no internal expansion slots, but a single direct memory access (DMA) port will let you attach a chain-like array of peripherals such as a second floppy-disk drive, a hard-disk drive, or up to 4 megabytes of additional memory that would function as a RAM disk. Atari says that because the DMA port supports transmission of up to 10 megabits per second, it can be used for linking STs to a network.

Atari lists software developers including Activision, Penguin Software, Haba Systems, SubLogic, Rising Star, Spinnaker, Sierra On-Line, Infocom, Lifetree, Mosaic, and Stoneware as committed to creating programs for the STs. Ashton-Tate, Lotus, Microsoft, and other major business software suppliers have yet to pledge support for the machines (or for Commodore's new Amiga, for that matter).

Atari's optical-disk drive for the ST, demonstrated at CES, is the most interesting hardware development. This kind of unit is sometimes called a CD ROM because it has read-only memory based on disks similar to those in audio compact-disk players. Because each disk can hold an enormous amount of information, a CD ROM is ideally suited to storing reference material that needs no updating.

The CD ROM for the Atari ST has been developed largely by Activenture (Monterey, CA), a company specializing in preparing and formatting data for optical disks. The first disk available for the system contains an encyclopedia (widely believed to be Grollier's) that you can search either by looking up a specific entry, by entering a keyword to get all entries in which that word appears, or by entering two words to retrieve, for instance, all entries that mention both "computers" and "medicine." Remarkably, the keyword index and the entire text of the encyclopedia take up only 20 percent of the available 540 megabytes of disk space.

Prices for the Atari ST's CD ROM option had not been set at press time, but it is expected that the drive and controller will cost less than $600 and that the individual disks will range in price from $20 to $300 depending on the information they contain.

—MICHAEL J. MILLER

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3	Mobil
4	Ford Motor
5	IBM
6	Texaco
7	E.I. du Pont
8	Standard Oil (Ind.)
9	Standard Oil of Cal.
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HP Delivers Portable Plus

In July, Hewlett-Packard introduced the Portable Plus, a more powerful and flexible version of its HP Portable computer. Like the HP Portable, the Portable Plus is battery-powered, uses an 80C86 central processor and low-power CMOS memory, runs the MS-DOS operating system, and weighs less than 10 pounds. But the new machine has an easier-to-read 25-line LCD screen in place of the older 16-line display and, also unlike the original, it will drive an optional external monochrome monitor.

But the Portable Plus's most notable enhancement is the availability of memory-expansion "drawers" that house either additional RAM or application programs stored on ROM cartridges. Conceivably, you could equip the machine with up to 898K bytes of RAM or 3 megabytes of ROM application programs (in actuality, you'd probably have a combination of lesser amounts of each). The ROM memory drawer lets you choose your applications, and the additional RAM compensates for the machine's lack of an internal disk drive.

At $2295, the Portable Plus includes 192K bytes of ROM (which holds MS-DOS 2.11, Personal Applications Manager (PAM), and HP Link, a program that lets you connect the machine to an IBM PC or compatible machine) and 128K bytes of RAM. A built-in 1200-baud modem is a $495 option. Each drawer for ROM cartridges costs $150. A RAM drawer with 128K bytes installed runs $595, and each additional 128K-byte expansion unit costs $495.

Among the programs to be available on ROM cartridges are Lotus's 1-2-3 ($495), Microsoft Word ($375), a combination of Memomaker and Time Management software ($195), and DEC VT-102 and HP-2622 terminal emulation programs ($395). If you want a portable disk drive, HP offers the 9114A, a $795 stand-alone battery-powered 3½-inch floppy-disk drive. Also, HP's Portable Desktop Link package lets you use the disk drive of an HP Touchscreen PC or IBM PC. —MICHAEL J. MILLER

HP's ENHANCED PORTABLE PLUS . . .

OBSERVATIONS

An Outline in Memory

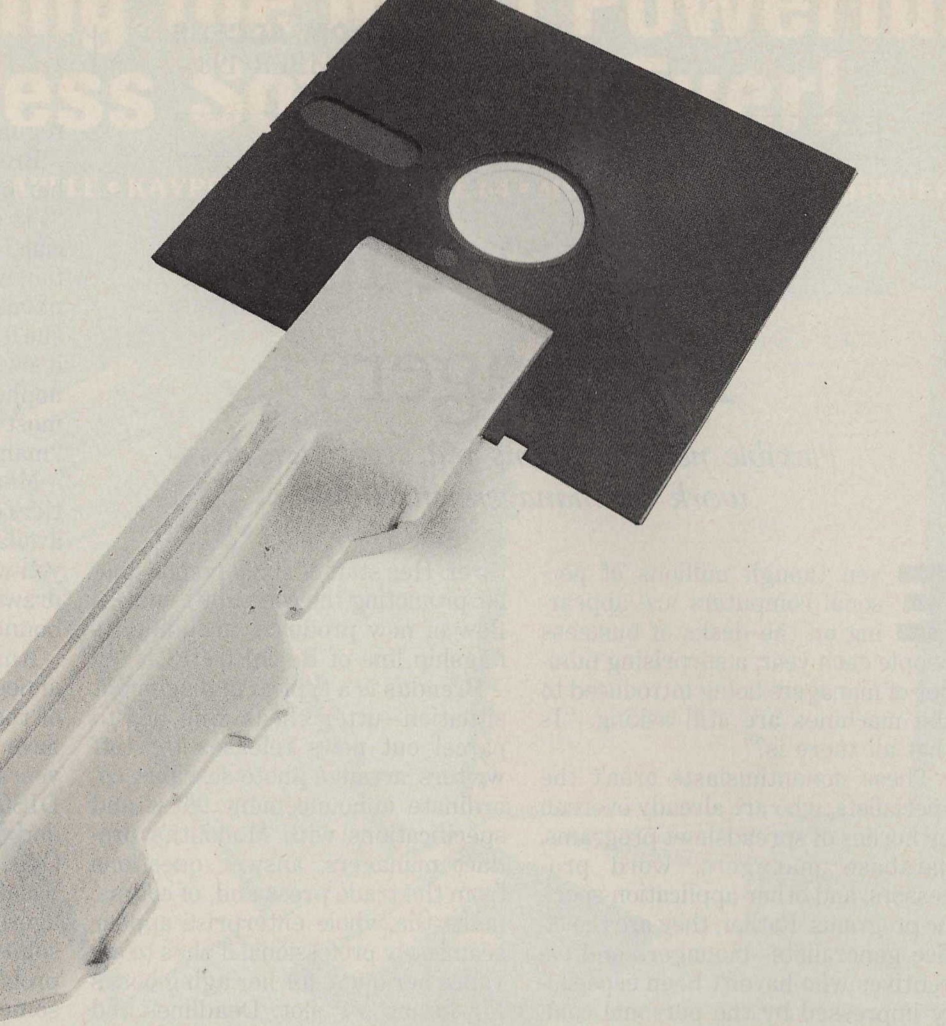
Living Videotext, known for ThinkTank, has come up with a new desk accessory—an outline processor that resides in memory. Code-named Bam-Bam, this $100 program for IBM PCs and compatibles includes all the outline-processing features of ThinkTank but not its editing or formatting features. Available at the touch of a key, Bam-Bam can instantly send data to DOS or application programs and can dial phone numbers. Living Videotext hopes the product will lead users to graduate to ThinkTank, but will those who otherwise would have tried ThinkTank find it that enticing?

Dynamic Communication

Two recently announced communications programs are among the first to support X.PC, an advanced telecommunications protocol developed by Tymnet, the nationwide network provider. The new protocol lets you access as many as 15 on-line services simultaneously and offers highly reliable error checking. Microsoft's $250 Access software provides a standard interface for retrieving information from Dow Jones News/Retrieval, CompuServe's Executive Information Service, NewsNet, and the Official Airline Guide. Access will display real-time data from as many as eight live connections in separate windows on the same screen. Also supporting X.PC, Microstuf's new $245 Crosstalk Mark 4 handles simultaneous connections either through windows or with a paging scheme that lets you switch between full-screen views of individual services.

Updates

■ Apricot has lowered the price of its entry-level 8086-based F1 computer to $995 and introduced two spinoffs, the F2 and the F10. The F1 includes 512K bytes of RAM, MS-DOS, Digital Research's GEM, an infrared keyboard, mouse, and one double-sided 3½-inch drive storing 720K bytes. The $1495 F2 comes with a pair of floppy-disk drives, and the F10 gives you one floppy-disk drive and one 10-megabyte hard-disk drive for $1995. ■ Two firms noted for powerful MS-DOS business word processors have developed less sophisticated versions of their products that are easier to learn and easier on the budget. Multimate recently announced Just Write, and Micropro International (of WordStar fame) plans to introduce an under $200 word processor sometime this summer. ■ Epson has introduced a pair of inexpensive daisy-wheel printers. The $299 DX-10 has a standard carriage and prints at 10 characters per second (cps); the $399 DX-20 has a wide carriage and prints at 20 cps. ■ Digital Research has released an updated version of its Concurrent DOS operating system, which lets users run several programs simultaneously on the IBM PC and similar machines. The new version (4.1) runs most programs written for MS-DOS 2.1 and works on machines with faster processors. ■ Still more firms are stripping copy protection from their software. Latest on the list are Thorn EMI's Perfect Software Series, Analytica's Reflex database for the IBM PC, and Electronic Arts' Get Organized.



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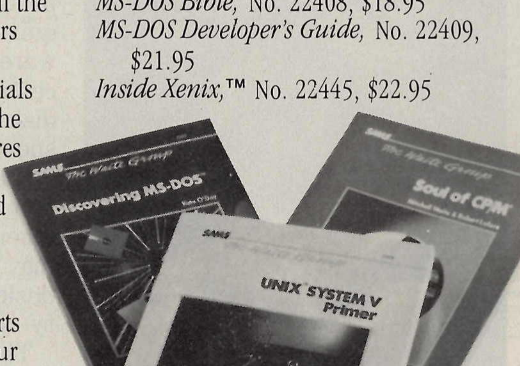

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BUSINESS

Software for Managers

Flexible new programs put computers to work on management chores

Even though millions of personal computers are appearing on the desks of business people each year, a surprising number of managers being introduced to the machines are still asking, "Is that all there is?"

These nonenthusiasts aren't the specialists, who are already overrun by hordes of spreadsheet programs, database managers, word processors, and other application-specific programs. Rather, they are the office generalists—managers and executives who haven't been especially impressed by the personal computer's fit to their particular needs. This is because there has been, until very recently, a dearth of software designed to cope specifically with the everyday chores of general managers.

To understand why this manager is such an elusive target, you have to look hard at what he or she does for a living. Although undeniably an oversimplification, it's not too far from the truth to say that a manager's job is almost exclusively the assignment, coordination, and direction—in short, the management—of events and people.

But this definition still begs the question of what a manager does all day. Typically, a manager responds to pressure from above, analyzes and assigns tasks to subordinates, deals with peers and outside contacts—all the while keeping a weather eye on events that are already planned or in progress. If this sounds dangerously close to abstract theorizing, a "real world" example may help.

Brenda Jones manages marketing communications for Monolith Industries, a major computer manufacturer. Her staff of six is responsible for promoting the company's endless flow of new products, including its flagship line of BelchFire PCs.

Brenda's is a typical management situation—utter chaos. She has to parcel out news releases to staff writers, arrange photo sessions, coordinate announcement dates and specifications with Monolith's product managers, answer questions from the trade press and, of course, make the whole enterprise appear seamlessly professional if she's to advance her quest for her aging boss's Marketing VP slot. Deadlines and follow-ups continually cascade on one another. All these activities involve other people, whom she must regularly either check on or with.

Brenda has a personal computer of her own, but it's rarely turned on. "I'm a communicator, not a technician," she says, adding that "it makes too much noise while I'm on the phone." In rare moments of candor, she'll admit, "It's more trouble than it's worth!" Brenda isn't really technophobic—she's right in rejecting most of the currently available "management support" software.

Meanwhile, she sits at a desk with tiers of sticky yellow notes on every available surface, a flood of while-you-were-out slips, and a bottom drawer filled with useless leather-bound "executive organizers."

Answering Brenda's organizational needs isn't a new challenge. Some of the biggest names in computing have been trying to respond for years: IBM, for example, with its DISOSS software on mainframes and Digital Equipment and Data General with their minicomputer-based All-In-One and CEO packages, respectively. These large-scale solutions to managers' individual problems may be the answer for some, but many people find the shared systems inflexible, cumbersome, or incomplete.

Personal computers, with their innate capacity to be tailored to the individual, would seem a near-ideal support tool for a harried manager. So why hasn't this worked out in practice? I think there are two main reasons.

First, until fairly recently desktop computers weren't powerful enough to perform the complex tracking, reporting, and correlating that's required to manage events with software. You've got to have a *fast* processor, lots of memory, and a hard disk. IBM's PC AT is a good prospect for handling truly effective management software, as is AT&T's new Unix PC. Apple's Macintosh, when equipped with a hard disk, may be even better because its desktop interface supports a variety of different projects.

The second reason, which is at least as important, is that most software developers haven't discovered what it is that managers need. That's a little amazing in itself, given that more than 10 million manage-

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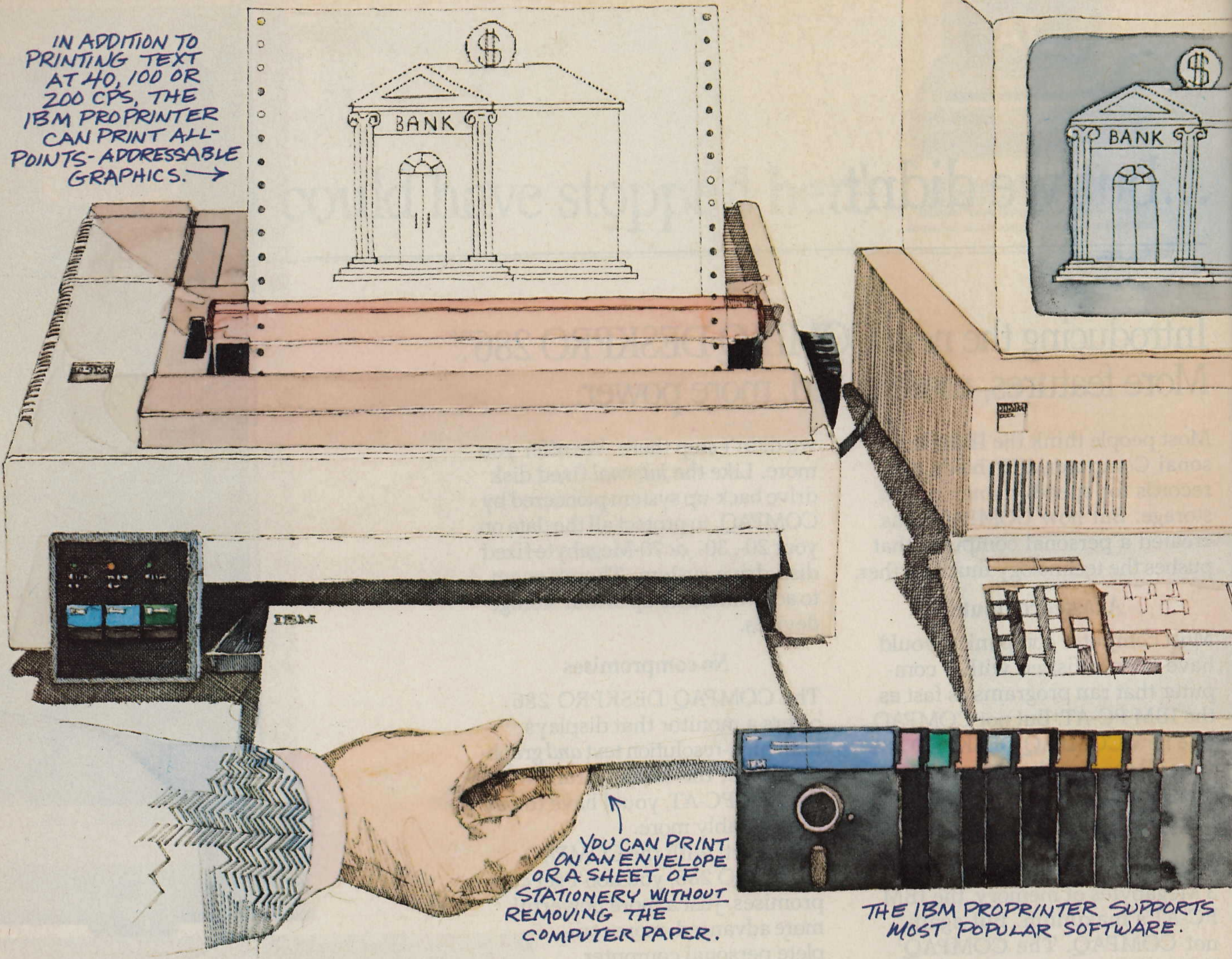
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ment types would go for this kind of software if it really worked. To be fair, understanding the largely subjective milieu of the manager takes a lot of study, and that takes time and money.

Granted, some software products lend managers a degree of help. At the lower end of the spectrum, you can find assorted calendar programs that will efficiently record your upcoming events and even beep at you when an appointment is about to occur. That's fine, but there's more to event management than just setting up electronic tickler files. At the upper end, you can get project-management programs that will outline project costs and schedules to a gnat's eyelash, but these are overkill—too complex to learn and use—for the rapidly changing, short-term events managers typically direct.

Also in this spectrum are the currently popular desk-accessory programs that typically reside in memory and offer calendars, phone directories, automatic dialers, and other goodies (see "Desk Accessories," August, page 58). These are more helpful than simple calendar programs, but their functions are not coordinated—the name on the appointment calendar, for instance, is not linked to the corresponding number in the phone directory.

What managers could benefit from is the software equivalent of the bowl of porridge that Goldilocks finally settled on: the one in the middle that was "just right." Finally, this kind of software is beginning to appear. The best example is a program called Higgins, which is at present the only one of this new genre that fully illustrates the potential of event-management systems.

I didn't pick Higgins (from Conetic Systems Inc., 1470 Doolittle Dr., San Leandro, CA 94577; 415-633-0291) because it's the cheapest program available (at $395 retail and requiring a hard disk, it's not) or because it is the easiest to learn (the manual, well-written though it is, runs a nontrivial 200-plus pages) but because it most completely answers all of the day-to-day needs of a general manager. This is partly because Higgins is the only program of its kind to be structured around a relational data manager, which means that the data you enter is automatically related to all similar items. If you establish a project category for, say, BelchFire 2000 (as Brenda might), you can retrieve *everything* related to that project with a single, simple command.

The "everything" I refer to may include appointments, notes, contacts, things you've established on your to-do list, and expenses incurred as part of the BelchFire 2000 project. Believe me, it's a remarkably liberating feeling to be able to command your computer to assemble virtually everything you need regarding a given project or management event. It's like the classic scenario of the bigwig who says to his secretary, "Get me everything on the Dalton deal," sending her scrambling after an armful of file folders, reports, schedules, and other scattered items.

But Higgins doesn't stop with a dynamic mechanism for coordinating data—it also provides a rational, highly visual way to enter and display your information. Eschewing the more traditional hierarchical organization, Higgins relies on a flexible and logical relational system that even has touches of intelligence. The program uses color very well to support its logic, and you begin to get the eerie feeling that a thoughtful hand is guiding you toward successful coordination of management details. Managers who aren't enthralled by technical sophistication and just want to get on with their jobs will really appreciate these features.

Realizing that managers move around a lot, Conetic has provided flexible ways to print out everything you throw into Higgins, including a detailed expense report for any project or time period you specify. Higgins can also be used as a reference tool in that it will organize standard files by keyword and link documents or spreadsheets to projects or individuals being managed by the program.

Is all this important? Yes—but it won't be self-evident until you've used Higgins for a couple of weeks and the piles of paper that used to be the main feature of your desk start melting down, consumed by Higgins's endless appetite for the minutiae of managing. No more will you be haunted by the scrawled reminder that gets buried in the pile, the telephone number that's never added to your rotary file, notes from a recent meeting that were stuffed in a drawer, or a missed luncheon that wasn't entered in your calendar because you left the calendar home that day.

Higgins can work for you individually, or it can be shared via a local network by a group of people with common projects and contacts. A new multiuser version of Higgins is designed to run on 3Com's EtherSeries—it will keep track of different users' work and ensure security by controlling access to the data it stores.

Higgins is not perfect, but it's the best illustration of a category that's still emerging. Actually, it's the only program (of any description) that has warranted leaving my computer on all day long. I would even venture to say that software like Higgins provides an altogether better metaphor for integrating applications than a spreadsheet or database—I wouldn't be surprised if we soon see integrated packages built around such event-management tools.

A few other software vendors have approached the event-management problem from different directions.

IntePlan, from Schuchardt Software Systems Inc. (515 Northgate Dr., San Rafael, CA 94903; 415-492-9330), doesn't have Higgins's relational elegance, but it costs less—at $195, it's what the British call "good value." IntePlan has two main segments: Agendas and Records. The Agenda portion does what you would expect from sophisticated calendaring software, and the Records component provides four highly structured hierarchical levels for storing information in increasingly detailed form.

IntePlan is one of a family of products that includes database management, spreadsheet, word-processing, and project-management programs. Each of these programs is priced separately, and the collec-

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tion lets you transfer data from IntePlan to the other modules (IntePlan records to an InteWrite memo, for instance, or some agenda items to an IntePert-managed project).

This cuts two ways, however. All of the "Inte" programs share a common command structure, which is a boon if you're learning a number of them at one time. On the other hand, it makes the commands in IntePlan less obvious than they are in Higgins, where they have been tailored to fit event management's specific requirements.

Tymon Inc. (519 First St., Kirkland, WA 98033; 206-828-9493) recently announced an entry in the event-management derby that carries a low price ($175) and some interesting features. Called PC Manager, the program offers a healthy dose of management theory along with its basic functions of calendaring, agenda management, and employee follow-up.

The theoretical premise of PC Manager is that you establish discrete goals and relate your events to these goals. The program then feeds back how well you're doing in terms of reaching those goals. This assessment gets interpreted by PC Manager, and messages appear that either chide you for sluggish performance or present the traditional "attaboy." These messages are supplemented by occasional sage quotations to spur your efforts.

Navigating around PC Manager is simple and straightforward—the brief manual is hardly needed. You can test-drive the program by requesting a demo copy that self-destructs after a couple of months. Conveniently, any files you create with the demo are preserved and may be used with a purchased version of PC Manager—only the trial programs disappear into the ether.

The Reminder System from Campbell Services Inc. (Suite 1070, 21700 Northwestern Hwy., Southfield, MI 48075; 800-521-9314 or 313-559-5955) is at the low end of the event-management scale both in price and functionality, yet it's worth considering if you aren't sure about this category of software. Essentially, the $99 program is a supercalendar that lets you establish up to 30 categories for consolidating upcoming events into related groups. Events can also be listed by keyword and prioritized on a one-to-nine scale.

You can also identify repetitive events occurring each week, month, quarter, or year, from your wedding anniversary to the monthly staff meeting. Up to 80 characters of text can be appended to each scheduled event, and The Reminder System outputs a daily list that shows where you stand. Events must be cancelled when completed or they come back to haunt you on the next day's list. Having this automated nag function is useful, but in practice, you can become so accustomed to an item popping up on the list that you fail to respond to it (probably more of a human problem than a glitch in the software design).

More event-management software is bound to follow, but even this modest roundup gives you a range of choices to help put your house in order. Some suggestions for the person who's convinced that there may be benefits in this area:

- If your software budget is already in the red, get The Reminder System, give it a try, and move up later to something more powerful.
- If the theory and techniques of management turn you on, try PC Manager's automated tutor.
- If you'd like to swap information between your event-management program and several other application programs, look into IntePlan and its siblings.
- If you find yourself in the same spot as our friend Brenda, however, forget about halfway measures. Buy Higgins, put your phone on hold for a week, study the manual, and catch up on all the crummy details that have been plaguing you. It won't be cheap, either in dollars laid out or time invested, but it could help you ward off managerial burnout.

—RICHARD DALTON

Richard Dalton, an editor of the newsletter *Open Systems: Managing Office Technology,* heads Keep/Track Corp., a San Francisco consulting firm.

MARKETPLACE

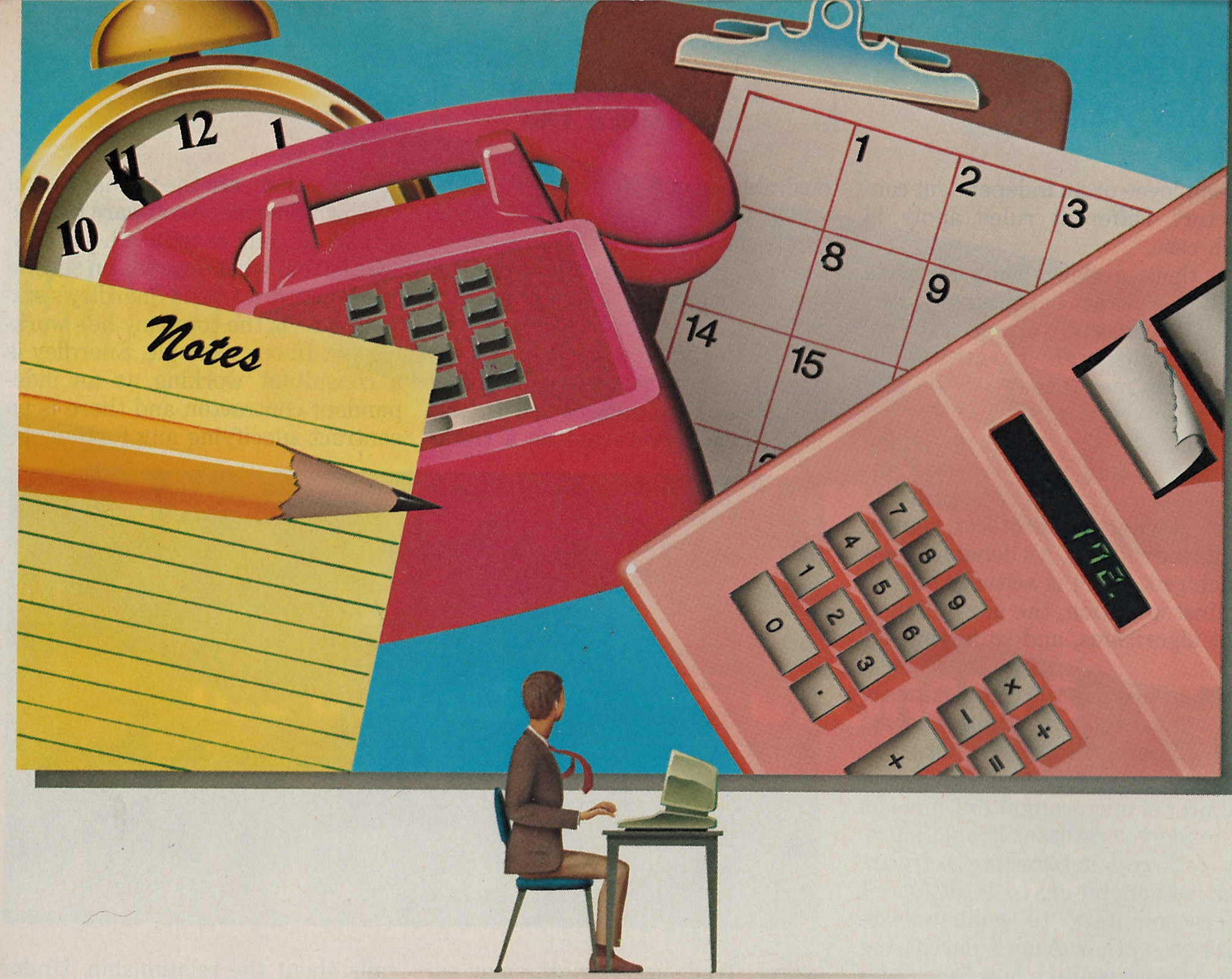
Who Owns Custom Software?

Legalities abound when it comes to one-of-a-kind programs

When an employee or consulting programmer develops a unique program or software system to meet specific business needs, who owns that software? More important, what does such ownership mean? Can a consultant use the same code in another job, perhaps even for a competitor? Can you as a business manager or owner prevent a disgruntled employee from taking the product of his or her work elsewhere? Specific written contracts or employment agreements can provide firm answers to these questions, but in the all-too-common absence of such agreements, both parties can find themselves in a morass of legalities without clear precedents.

Essentially, the rights to software developed on a custom basis hinge on four rather complex questions:

- How is the software legally protected? Each of the three ways of protecting software—copyright, patent, and trade secret—defines ownership in a different way.
- Is the developer of the software



POP ART

Q. What would you call a desktop software package that can **Pop-Up Anything**—spreadsheets, databases, or even DOS—over another application? What if it also offers a Pop-Up Standard Calculator *and* Financial/Statistical Calculator, Alarm Clock, Notepad, Clipboard, Calendar, *plus* PopDOS and Pop-Up Voice to dial your phone automatically? What would you call a single package that does all this, is non-copy protected and sells for $69.95?

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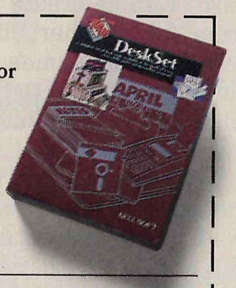

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an employee or an independent contractor? Different rules apply in each case.

- Is there a clear, comprehensive written contract specifying ownership? If so, matters are greatly simplified, although exactly what ownership means may still be subject to interpretation.
- What are the rules governing ownership, and what does ownership—once established—protect? While ownership protects against duplicate copying, it's debatable how much protection is actually offered against imitation, the use of important algorithms, and so forth.

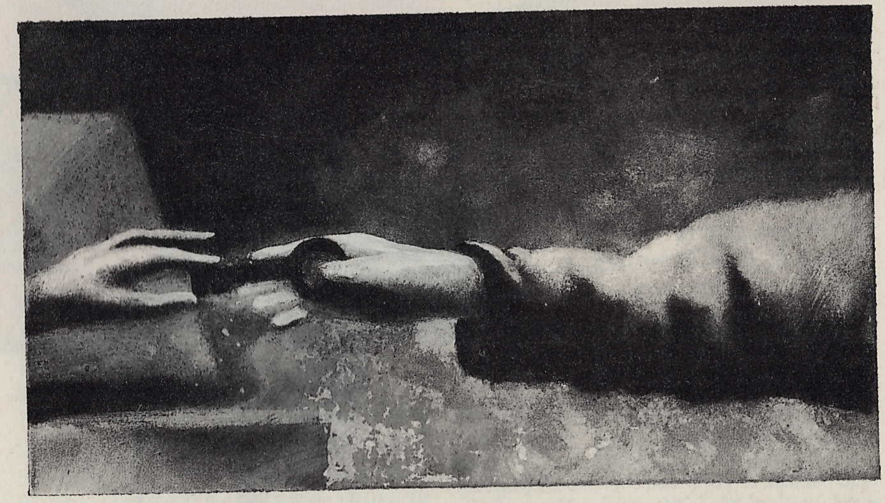
To illustrate the complexities of legal interpretation involved here, let's use an example. Suppose that Acme Micros, a manufacturer of microcomputers, hires independent consultant Frank Snerdley to write networking software that will enable up to 15 of Acme's microcomputers to communicate with each other. Acme's purchasing department issues a purchase order that does no more than describe Snerdley's job and specify the payment terms and completion date (which is typical in such arrangements).

Snerdley does his job well—he delivers the program on time and for the specified price. Acme is satisfied. But what does Acme own? What rights does it have to assert against its competitors? Does Acme own all documentation? Conversely, what are Snerdley's rights to the software? Can he create a similar program for another client, perhaps even one of Acme's competitors? Pursuing answers to these concerns takes us through the four questions outlined above.

For both Acme and its consultant, the first concern is how Snerdley's work can be protected. It makes a difference whether the program code is copyrighted, treated as a trade secret, or patented.

Virtually all original software is copyrightable. The copyright comes into existence when the software is stored in a "tangible medium of expression," which includes magnetic media as well as paper. Paying the $10 fee to register the copyright is desirable—you can't bring suit without it, for one thing—but the legal rights remain in effect even *without* the registration. Exactly who owns this copyright is a matter we'll examine in due course.

If Acme values part or all of Snerdley's program by being selective about who gets to see it, the code is then protected as a trade secret. Trade-secret rights may exist in addition to a copyright. This protection becomes especially important for those parts of programs that are not copyrightable, such as mathematical formulas or algorithms. The ambiguity surrounding trade-secret protection arises when misappropriation of the secret is alleged—a claim that must be decided in court for each individual case.



In some instances software may be patented, but this option is not widely known or practiced (perhaps because patenting software is costly in terms of legal fees and chancy in terms of the court's decision about whether a given program is patentable). But it *is* possible to patent software as Merrill Lynch's patented Cash Management Accountant software proves. Patents provide broader, more detailed protection than do either copyrights or trade secrets, and they are infringed even if the infringement is innocent and unintentional. Under certain circumstances, a patent can even permit the income from an exclusive licensing or sale of the patent to be taxed at a lower capital gain rate.

These, then, are the primary ways in which Snerdley's software may be protected, but exactly who is protected from what depends on several other matters. One is Snerdley's status vis-à-vis the company he's working for. In our example, Snerdley is a consultant working as an independent contractor, and there is no contract specifying any further details about the relationship. Under these circumstances, Snerdley owns the copyright to the software he creates. Had Snerdley been an employee of Acme, or had he signed a contract that granted Acme rights to his work, then Acme would own the copyright.

A written contract that goes beyond the simple purchase-order agreement between Snerdley and Acme would help to clarify the ownership issue. Even a simple statement that delineates rights of ownership becomes legally binding when it's signed by both parties. In our example, Acme's purchase order would function as a contract if it had specified that "Acme will own all patent, trade secret, and copyright rights and all related documentation in the software created by Snerdley"—this would leave Snerdley no legal grounds for claiming ownership. Clearly, then, such a contract is one of the best ways—and certainly the simplest way—for a company like Acme to establish ownership rights to software created by an independent contractor.

The three issues we've examined so far—how the software is protected, the programmer's status as

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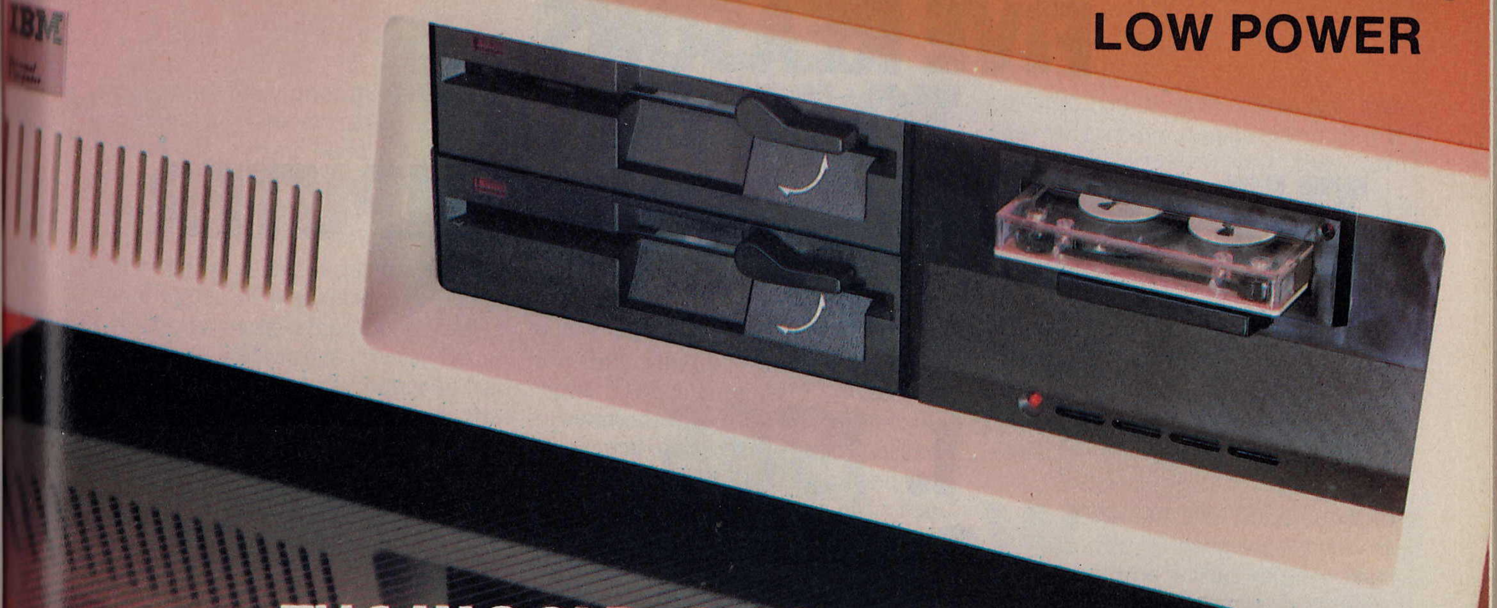

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employee or nonemployee, and whether a clear written contract exists—all lead up to the big question: who ultimately owns a custom software package and what does such ownership mean? Let's consider the situation under each of the three types of protection.

As far as ownership of copyrights goes, if the software is created by an employee in the performance of his job, then the employer owns the copyright to that software. But in our example, Snerdley, as a consultant, owns the copyright unless a written contract specifies otherwise. However, two recent court decisions have held that when the employer "controls and directly supervises" the consultant's work, the consultant will be treated as an employee when it comes to copyright ownership. In this gray area where precedents are only now being established, Acme could come away with copyright ownership.

Owning the copyright on a unique software program means that someone else cannot legally duplicate that program line for line, or even almost line for line (the legalese is that there may not be "substantial similarity"). But what if Acme owns the copyright to Snerdley's program and Snerdley, who is so familiar with the program that he needs none of the documentation created for Acme to reproduce it, wants to create a similar program for a new client who just happens to be Acme's competitor? Or what if he translates the program into a different computer language or creates a new program based on the same algorithm? These questions, currently under litigation in a number of lawsuits where they have elicited widely divergent legal claims, underscore the value of clear, specific written contracts.

But the ambiguity surrounding the ownership of and protection afforded by trade secrets is even greater. One reason is that trade secrets are governed by state law while copyrights and patents are federally regulated. In most states, an employer owns a trade secret created by an employee. The ownership of trade secrets created by a consultant is not certain and usually depends on the intention of the parties. However, in a handful of states, an employee may use on a new job whatever trade secrets he created provided there is no contract to the contrary.

The protection offered to the owner of a trade secret is even fuzzier than that provided by a copyright. Direct copying is, of course, prevented, but what if an employee or consultant knows an important trade secret that could be used in a new job? The answer is not clear, and such uncertainty leads to situations like the one involving a Bell Labs networking program comprising 400,000 lines of code: the court enjoined two Bell Labs ex-employees from working for the competition for a period of six months on the grounds that trade secrets might be misappropriated. This ruling was in spite of the facts that the ex-employees took no documentation and did nothing that suggested impure intentions.

When software is protected by a patent, ownership rights are a little clearer. A patentable program created by an employee is owned by the employer only if the employee was "hired to invent," a phrase that's subject to interpretation unless specified in a contract. This same rule applies to nonemployees such as Snerdley. Even if an employee or consultant owns the patent, however, the employer has a "shopright"—a nonexclusive, royalty-free right to use the patented program.

The protection offered by a patent is easier to pin down than that of copyrights or trade secrets, but it usually takes a patent lawyer to determine the legal protection afforded by the patent. A patent can be broad enough to cover concepts such as algorithms as well as tangible details, and it can potentially give much wider legal protection than a copyright or trade secret.

Because of the vagaries of interpretation surrounding copyrights and trade secrets, it is becoming more common for employment and consulting agreements to include "noncompete" provisions that bar the employee or consultant from working for the employer's competitors. Such provisions are not generally looked on with favor in the computer industry, but they are legally enforceable if quite limited. For instance, while it might be unfair to bar Snerdley from working on networking software in general, Acme probably could keep him from working for one or two of its chief competitors for six months or so (except in California, where non-compete clauses are invalid in most cases).

What all this boils down to for a company such as Acme is that simple, clearly written contracts and employment agreements can avoid many headaches. If they are specific enough to cover the concerns that have been raised here, such documents can establish with reasonable certainty the general rights and obligations of the parties.

In the absence of a contract to the contrary, consultants like Snerdley own the copyright on their creations. Whether they own trade secrets depends on the laws of the particular state and the intention of the parties. If a broad patent is applied to the work of a consultant by the employer, the consultant probably cannot reuse the patented code.

If Snerdley were an employee, copyright protection would go to the employer. Snerdley the employee might hang onto trade secret rights if he did all his work on his own time with his own computer and didn't take away any of the employer's documents or advertise what he was doing. At any rate, Snerdley, whether employee or consultant, better be prepared to defend himself in court if he reuses portions of the work done for Acme.

Because the field is so new and almost every case is different, employers, employees, and consultants all need to be aware of the complexity of determining ownership of custom-developed software. Translating this awareness into detailed written agreements helps both parties know where they stand.

—ROBERT S. BRAMSON

Robert S. Bramson heads the computer law group for the Philadelphia, New York, and Washington, DC, firm of Schnader, Harrison, Segal & Lewis.

TELECOMPUTING

On-line Farming

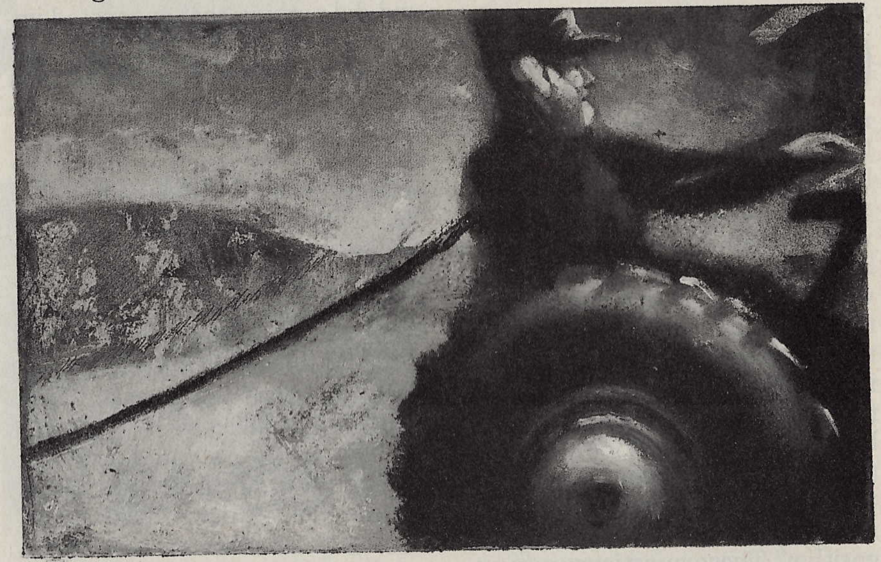
As in other industries and markets, telecomputing services have helped farmers reap greater profits

It's no secret that agriculture—like other traditional industries—is facing hard times. Smaller farms especially have suffered from falling credit ratings, sagging foreign sales, and depressed prices for too bountiful crops. But like people in many other businesses where up-to-the-minute market data can make the difference between profit and loss, farmers are increasingly finding that on-line networks and databases—accessed with a personal computer and modem—are among their most valuable business tools.

Small family-run farms have been hit hard by competition from giant agricultural conglomerates that have the advantage of sheer economy of scale. "The sad but inevitable fact is that 600,000 to 700,000 middle-sized farms will not be financially able to continue," reports Richard Weening, president of Milwaukee-based AgriData Resources. Small farms that do make it will in many cases owe their survival to on-line services, such as Weening's AgriData Network, that provide market data and sophisticated business tools that put the "lifestyle farmers" on more equal footing with the megafarms.

With no control over their markets, farmers caught in the squeeze are forced to seek survival in better management methods. "Farming is a terribly complicated business," says Scott Watson, editor of Doane Publishing's *Agricultural Computing Newsletter* (St. Louis, MO). "Often a single farmer has several businesses—swine, corn, and seed, for instance—all on one farm. Then the farmer may be incorporated, may be sharecropping some land, may be renting other acreage, and may be someone else's landlord. This creates terribly complicated records."

The more progressive farmers, the ones most likely to survive, are turning to personal computers to help them sort out these complexities. And it generally doesn't take a micro-equipped farmer long to discover the value of on-line agricultural services and databases. "Bad times make good managers," says John Duvenaud, western regional manager of the Canadian Grassroots agricultural on-line service (Winnipeg, Man.) and a farmer with a business degree himself. "Many farmers who are not in trouble but have to watch their money see a service like Grassroots as an investment that will more than pay for itself. If times were really good, they wouldn't need Grassroots."



The most valuable service on-line agricultural networks offer is up-to-the-minute information on the commodities markets where farmers sell crops. Because prices can change hourly, an instantly updated electronic report is far more useful than information from any other source. By tapping an electronic commodities-market report, farmers can track market trends and watch current prices to determine precisely when to sell.

"When you have 50,000 to 100,000 bushels of corn, an extra dime a bushel can be very profitable," says Rex Wilmore, vice president of Professional Farmers of America (Cedar Falls, IA), which publishes several agricultural market newsletters and provides the Instant Update and Instant Futures on-line databases. Wilmore cites a typical case in which an on-line farmer made $5000 based on a single piece of information from the Instant Update service, quite a return on the farmer's annual investment of $800 in on-line subscription fees.

Because market watching is vital to every farmer, all on-line agricultural services carry extensive commodities and futures market information. Instant Update specializes in it, but AgriData network and Grassroots also carry commodities-market "tickers" and newsletters. Not only do these electronic services offer more timely information, they offer it for less than it would cost to subscribe to a number of printed newsletters. Duvenaud estimates, for instance, that to get the same amount of information a $150 Grassroots subscription provides, the farmer would have to pay $1000 in subscription fees for printed newsletters.

In addition to the market "tickers," the on-line services also offer

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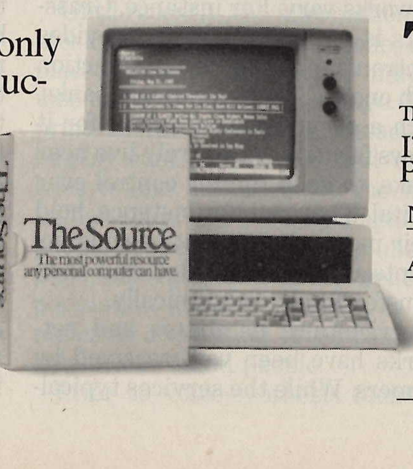

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elaborate charts of market activity showing daily highs, lows, and averages, moving averages, and the like. Once again, a good paper-based charting service can cost as much as $400 a month, but the on-line charts, which are updated daily, come as a part of the on-line network's basic services.

For many farmers, this profusion of detailed information is a revelation. Physically isolated, they never before had direct access to the markets they are dependent on. As Grassroots' Duvenaud puts it, "For the first time we put farmers on a par—in terms of market information—with the agricultural traders they must deal with."

As vital as it is by itself, market information is only one resource an on-line farmer has access to. For instance, AgriData has its own agricultural news bureau in Washington to supplement the coverage provided by the AP newswire and other sources, and Grassroots is known for its comprehensive weather service, which uses computer-graphics technology to give the farmer up-to-the-minute weather maps.

Another service that's unique to computer-based networks is computer modeling, in which sophisticated programs simulate a variety of plans and projects. For example, Grassroots offers an herbicide usage planner developed from research done by the Manitoba Department of Agriculture, agricultural universities, and herbicide makers. It covers 15 crops and 50 varieties of weeds that grow in western Canada. The farmer simply specifies the crop and the weeds that are competing with it, and in 90 seconds the program delivers recommendations for eliminating the weeds. These might include two single-herbicide choices plus five tank mixes of two or more herbicides, all designed to kill the weeds and spare the crops. Also, the model gives the farmer optimal spraying schedules and determines the costs for each suggested approach.

FACTS (Fast Agricultural Communications Terminal System, developed by and housed at Purdue University in West Lafayette, Indiana) is another on-line agricultural service that provides a comprehensive modeling system. Rather than modeling a specific project, FACTS uses a lengthy linear program to give a complete analysis of the entire farm operation as a whole. Agnet, a system based at the University of Nebraska, offers over 200 modeling programs for everything from business projections to irrigation schedules.

As in other businesses in which time is of the essence, farmers with access to the most current vital statistics have the competitive edge.

Also, most on-line agricultural services provide electronic mail and transactional services. On FACTS, for instance, electronic mail has been used to distribute flood warnings and to track the spread of agricultural pests and diseases. Given that a single spraying of a farm typically costs more than a year's subscription to any of the agricultural services, reliable and timely information about the threat posed by a pest or disease can save lots of money.

Beyond basic market information, news and weather, modeling systems, and transactional services, the offerings of different agricultural networks vary. For instance, Grassroots is unusual in that it provides electronic banking in conjunction with one of Canada's national banks. Such a service makes sense, for it allows farmers, who rarely live near banks, to keep tighter control over capital. They can, for instance, hold their money in interest-bearing accounts until it is needed and then transfer funds electronically.

Agricultural databases and networks have been well received by farmers. While the services typically will not release subscription figures, Grassroots' Duvenaud reports that in Manitoba (which can hardly be called a hotbed of personal computer use) approximately 15 percent of commercial farmers are now on-line and 20 new subscribers sign up every month.

Another clear indication of the degree to which farmers have accepted and benefited from the on-line agricultural services is seen in Saskatchewan, where Sastel, the local telephone company, established a digital system that offers access to virtually every large agricultural network in North America. Thanks to Sastel's technology, a number of the premier services, including Grassroots, AgriData, and Agnet, met in head-to-head competition for the first time. But instead of favoring one over the others, Saskatchewan farmers are using all the services. Sastel spokesman Floyd Heidecker says new users tend to start with the least expensive service, but they quickly subscribe to the others as they learn their value.

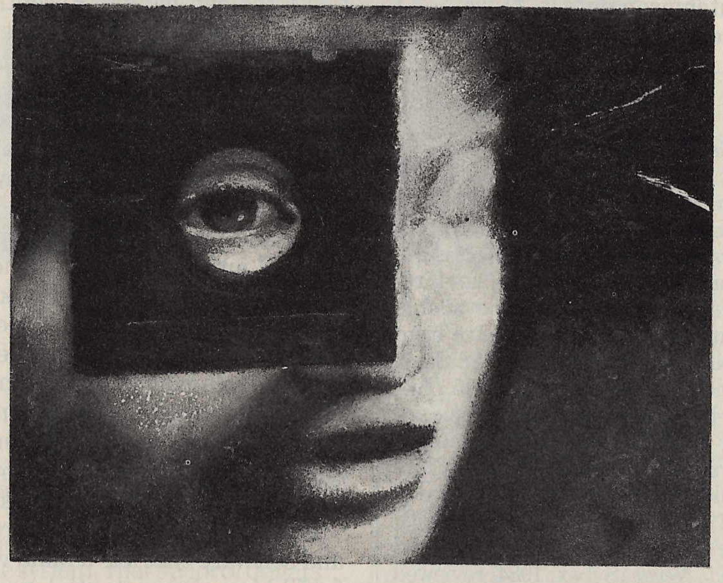
This trend toward increased use of on-line agricultural services seems likely to continue and even accelerate. *Agricultural Computing Newsletter* editor Watson predicts "a tremendous increase in databases because the local agricultural extension agents will get very involved in them. A county extension agent can be on only so many farms a day. Databases can be used in the office to get quick answers, run templates, read newsletters, and so on. Even small farms that can't justify a computer can use the one in the extension office."

Farmers have adopted the new technology not in spite of but because of their current dire economic straits. They quickly recoup their initial investment in terms of the value of timely on-line information. As in other businesses in which time is of the essence, farmers with access to up-to-the-minute vital statistics have the competitive edge, an edge that—given agriculture's current slump—may be the difference between staying in business and going under. AgriData's Weening says that the current economic crisis will restructure agriculture as we know it, and "only the very best business managers, those flexible enough to adopt new business methods and tools like the computer, will survive as full-time farmers."

—G. Berton Latamore

G. Berton Latamore, editor of the newsletter *VideoPrint*, wrote "On-line Grocery Shopping on the Way" for April's *Popular Computing*.

AT LARGE



New Chances for Blind Workers

Today's technology helps the visually handicapped get on the payroll

My productivity has increased by a factor of three," reports Al Gayzagian, director of corporate analysis for John Hancock Mutual Life Insurance Company. "What used to take five or six steps with the help of my secretary I can now do alone in two or three."

Gayzagian's work style changed abruptly when he purchased an Apple IIe two years ago, for the computer gave him independent access to information. Blind since birth, Gayzagian used to rely on human intervention—a secretary or reader—to access printed materials at work. The Apple IIe with a speech synthesizer or braille output device lets him manipulate data himself.

"I never told anyone at the company, but in the early days I used an abacus to keep track of statistics. It worked, but it sure was slow. Now I laugh about it, but it wasn't funny then," recalls Gayzagian.

Until recently, the information explosion that began a decade ago placed visually handicapped individuals at a greater disadvantage. The print barrier has been an obstacle to employment, education, and even leisure-time activities for the half million blind and visually impaired people in the U.S. While the unemployment rate among the general population steadily declines, it remains at a shocking 70 percent for employable blind people.

Prior to voice-synthesis technology, blind individuals relied on three methods of accessing print: tape recordings, human readers, and braille. All three are time-consuming, limited in availability, and dependent on others. Now, for the first time, speech output devices give blind people immediate and independent access to electronic information.

Barry Scheur, a blind attorney in Newton, Massachusetts, describes the difference this technology has made in his practice: "Previously, if I needed to do legal research, I had to pay someone to go to the library, look up the documents I needed, send those documents to a braille or recording house, wait months—sometimes six months—for the materials to be returned, and then do my research. Obviously, I needed either very patient clients or some other method. Generally I paid readers, which meant money and scheduling.

"Today, with my talking Apple and braille output device, I access a legal database, automatically search for the appropriate documents, download the materials on my Apple, and then read them off-line—all by myself. How has this affected my life? First, I have more business than I know what to do with, and second, my wife is now a computer widow."

Speech synthesizers and special adaptive software are the two critical developments that have placed talking microcomputers within the reach of the visually impaired population. Speech synthesizers fall into two general classes—expensive and inexpensive. The inexpensive models, like Street Electronics' Echo GP (1140 Mark Ave., Carpinteria, CA 93013) and the Votrax Type 'N Talk (1394 Rankin Rd., Troy, MI 48084), range from $150 to $400 and offer low-quality but intelligible speech. The more expensive speech synthesizers, such as Digital Equipment Corp.'s DECtalk (146 Main St., Maynard, MA 01754), cost around $4000 and sound almost human.

For speech output, a synthesizer attached to a microcomputer's RS-232 port serves in place of or in addition to a printer as the destination of ASCII output. The speech is produced by a chip in the synthesizer that vocalizes the different phonemes of the English language. The more expensive voice synthesizers like DECtalk have larger "exception dictionaries" and thus mispronounce fewer words.

But listening to information is not the same as reading it. Listeners, unlike readers, cannot skip over material, speed up or slow down, or just plain stop the flow of information. Readers can also scan printed material, but blind persons using a speech synthesizer get a word-by-word review and then it's gone. To review the material, they must regenerate it by repeating the commands that created the text in the first place.

Special adaptive software provides the necessary review functions to overcome this limitation. Such software enables blind users to selectively access needed information while skipping over the superfluous. They can instruct the computer to repeat characters, words, lines, or entire sections of text. With the appropriate software, blind users can have the computer verbalize corrections, identify columns, or skip repeated characters.

David Holladay, of Raised Dot Computing (408 South Baldwin St., Madison, WI 53703), was a pioneer in the development of special adaptive software who first got involved by adapting software for his wife, a blind mathematics professor. This work led him to write Braille-Edit, a sophisticated word-processing/speech program for the Apple IIe that has become the best-selling piece of adaptive software in the field. What has attracted over 500 schools, agencies, and individuals to Braille-Edit is its multipurpose application as a talking word processor and its ability to handle translations from print to braille and vice versa.

Another such entrepreneur is Ron Hutchinson, founder of Computer Conversations (2350 North Fourth St., Columbus, OH 43202). Ron lost his sight seven years ago, but he wanted to continue his work as a systems programmer. Unable to find the adaptive software he needed, he wrote his own program. Hutchinson's Enhanced PC Talking Program now runs on 34 different machines, including the IBM PC.

The Enhanced PC Talking Program is a machine-language program that integrates itself into the computer's operating system. This unique feature allows blind persons to use the software interactively with 1-2-3, WordStar, Multiplan, and many other standard applications. As Hutchinson puts it, "I wanted to be able to use computers the same way I did when I could see."

RESOURCES

The Second Beginner's Guide to Personal Computers for the Blind and Visually Impaired, written by blind computer users, covers microcomputers, speech-synthesis hardware, special software, training, and resources for blind users. It's available in print, braille, or on cassette from the National Braille Press, 88 Saint Stephen St., Boston, MA 02115. Two other books that address the topic are Peter McWilliams's *Personal Computers and the Disabled* (Quantum/Doubleday, 1984, reviewed in November 1984, page 190) and Frank G. Bowe's *Personal Computers and Special Needs* (Sybex, 1984, reviewed in March 1985, page 177). And *Popular Computing* itself is now available in a braille edition from the Library of Congress.

An enthusiastic user of the Enhanced PC Talking Program is Olga Espinola, a blind customer service representative at the Worcester County (Massachusetts) Institution for Savings. "When I came to the bank," Espinola says, "we weren't sure how I would be able to access the information in our computers. I started off calculating mortgage rates using a TI-59 talking programmable calculator.

"But since I began using Ron's program, my job has changed radically in just four months," Espinola says. "With the Enhanced PC Talking Program on my Compaq, I can handle any customer inquiry. In fact, my boss was out last week, and the comptroller called *me* for a figure."

Espinola's boss shares the same perspective. "This technology works," says Frank Brown, senior vice president of WCiS. "That's not to say the computer alone is making Olga successful," Brown quickly points out, citing Espinola's math training, orderly mind, and strong intellect as even more important factors in her success. "The computer is a tool for breaking down the print barrier and increasing her productivity. Her job is constantly changing as we discover more and more tasks she can handle. Recently she began calculating the average yield paid on deposits—an immensely complicated job. Until now, I was the only one at the bank who handled that sort of thing," Brown says.

Not all employers are as convinced as Frank Brown, however. Most small and medium-sized companies are still unwilling to hire blind people, according to Dina Wischkin, director of Project CABLE, a Newton, Massachusetts, service that teaches blind people how to use computers. "Only the major corporations are willing to take on a blind person—smaller companies think it would be too costly," Wischkin reports.

But because the special hardware and software that lets a blind worker fulfill his or her potential currently costs less than $1000, even small-business owners may soon have their minds changed. "Now, when a blind person interviews for a job and the prospective boss asks how the candidate is going to do the job," Ron Hutchinson explains, "the blind person can take out a portable computer, a small speech synthesizer, and speech software and on the spot show the employer exactly how the job will be done."

The payoff for blind people who become familiar with the new technology will be jobs. "The print barrier is tumbling down," says Curtis Chong, a blind systems programmer at IDS/American Express. "Now we need to tear down the attitudinal barrier that says blind people can't handle jobs. Employers must be willing to accept blind people on the basis of their qualifications, not on any preconceived notions of what blind people can do."

Given today's speech-synthesis technology and special adaptive software, what blind people can do is becoming impossible to ignore.

—DIANE L. CROFT

Diane L. Croft has edited two books on personal computers for the blind.

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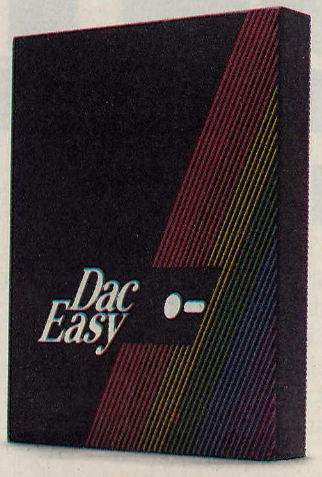

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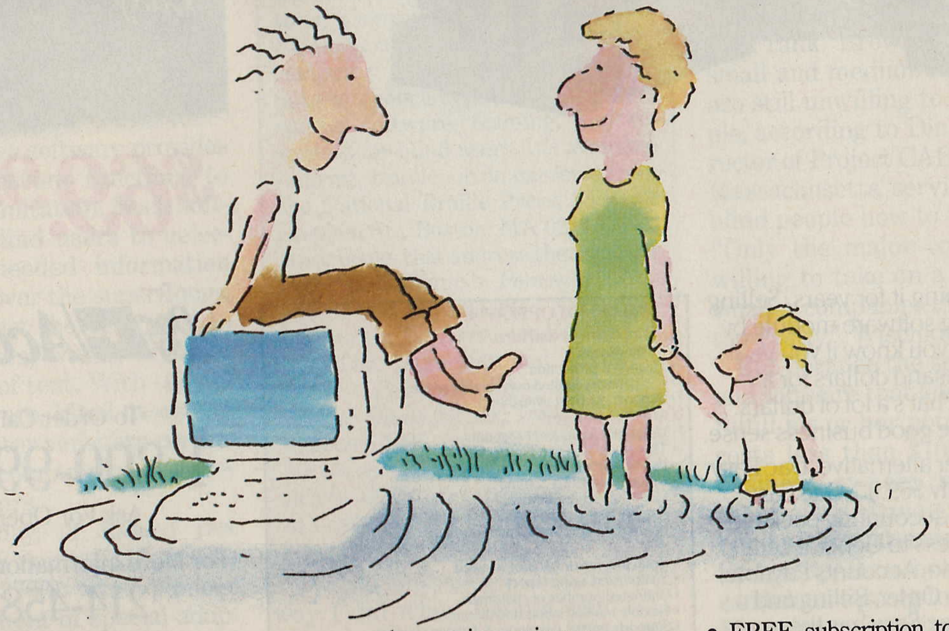

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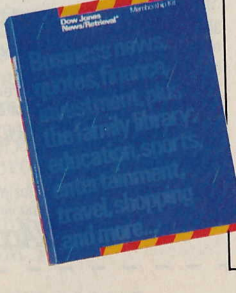
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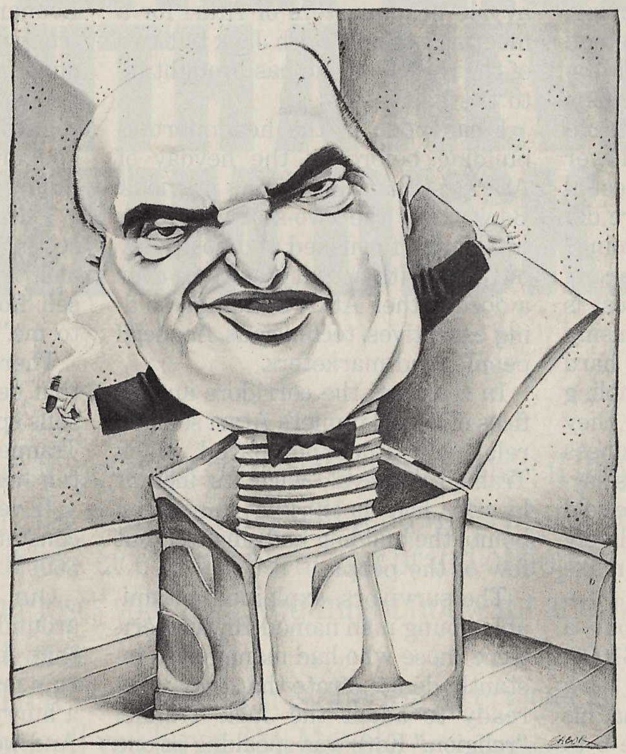
COMPUTER JOURNAL
BY STEVEN LEVY

The Atari Conundrum

Does Jackintosh offer Rock Bottom Prices or Rock Bottom Logic?



Getting an appointment to see Jack Tramiel is no picnic. The relationship between the press and Atari, the once mighty electronics firm that Jack Tramiel took over last year, is not what you call cozy.

There is an odd idea of productivity engendered by Jack Tramiel among his minions that seems to be particularly in effect when a member of the press corps naively picks up a telephone and attempts verbal intercourse with an authorized Atari representative: in the vast majority of these instances, the journalistic supplicant is turned away, sometimes with the implication that the call might be returned. (Seldom is the call returned.)

What does this have to do with productivity? I think we scriveners are to infer that the folks at Atari are simply too busy *working* to talk to us. That sort of activity is a luxury reserved for those big spenders at Apple or even IBM, where computers are sold not at Rock Bottom Prices but with margins that allow for the hiring of public relations people and the printing of fat press kits.

I use the term Rock Bottom Prices because the Atari ST series of computers was code-named RBP for that very reason. And indeed, last January Atari announced the still-undelivered (as of June) "Jackintosh" computer at a shockingly low price, a third of the cost of a Macintosh, with comparable power. Could those price points be possible if such frivolous expenses were incurred? Maybe not.

On the other hand, sometimes talking to the press helps a company to sell some computers if the message it wants to bring to consumers makes any sense at all. It might even be argued that a penny spent in press relations is worth a dollar in advertising. In initiating a rocky relationship with groups that could aid its corporate purpose, groups like the press and third-party software developers, the new Atari sometimes engages in a form of Rock Bottom Logic, wherein an arrogant bravado and a near canonization of its leader are offered to replace constructive discourse.

But sometimes even Jack Tramiel relents and embraces fellow members of the technology community. For example, early this year, when Atari came to CES to unveil its new machines, the people who hadn't been able to come to the phone for weeks at a stretch, notably Jack Tramiel, were not only present but effusive. To see him at CES, you would think him a consistently jovial fellow, portly, and bald—you had to remind yourself that this was the computer industry's toughest competitor, a former concentration camp victim who had built his former company, Commodore, into a billion-dollar corporation by espousing a "religion" based on such principles as "Business is war."

He even offered an olive branch to his old antagonists, the third-party software publishers. At Commodore, he had made life difficult for those who tried to write software for his machines, but now, he said in an address to the Software Publishers Association, "We need you." He vowed to actually give some financial assistance to bright young companies with good ideas that could translate to software that would complement his remarkable computers.

It was a happy time for Jack because the prices he was promising for his computers were truly revolutionary. At a price of around $1200 (for a 512K computer that uses Digital Research's Mac-alike GEM, a 500K disk drive, color monitor, and

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Steven Levy is a New York-based contributing editor of *Popular Computing*.

Illustration by Tim Gabor

printer) it was a system powerful enough for all sorts of use, even "serious" business applications—especially when Jack announced to the software publishers that "in May or June" Atari would be shipping a 15-megabyte hard-disk drive that would work with the ST. The drive would retail for $395. With prices like this, Jack promised, Atari would do a billion-dollar business in 1985, selling 5 million machines.

Does Atari Mean Business?

I found his performance dizzying. But his brief public display seemed to raise as many questions as it answered. It is accepted as a truism that with microcomputers the trend is always more power at lower prices, but a break *this* big could bring dramatic changes. Where did Tramiel see these machines going? On one hand, the market where computer power has meant the most is business, and Atari was promising the same features (memory, hard disk, etc.) that Apple was scrambling to add to the Macintosh so they could call that computer a business machine. But Jack Tramiel was saying that his computers would be sold in K Marts and Toys-R-Us, unlikely places for MIS managers to make large purchases.

Are we talking, then, about a home computer? At over $1000, that's an expensive appliance for a family. Tramiel was insisting that his market was people from "age 6 to 26," the youth of America. But at the same time, Atari's software VP was boasting that the featured program for the Jackintosh would be a Lotus 1-2-3 clone costing less than $100. What 10-year-old needs a 700-row spreadsheet?

All in all, the price of those high-technology machines seemed to call for no less than a philosophical reconsideration of who bought computers and how many could ultimately benefit from them. Tramiel seemed to be the person to talk to. He has long been obsessed with the idea of tossing high technology into the marketplace at bargain-basement prices. I was also consumed with curiosity about how Jack Tramiel had changed Atari since his lightning-quick purchase in mid-1984. Atari had once been the symbol of volcanic growth in this industry, and its brutal fall was one of the great business horror stories of our time. How could even Jack Tramiel, a man whose employees do not hesitate to liken to Lee Iacocca and Henry Ford, turn it around?

The Neutron Bomb Effect

It took many phone calls and some heady negotiation, but finally, not long after that CES show in January, I was permitted to visit the Sunnyvale headquarters of Atari for a meeting not only with Jack but two of the three sons he has brought into the business.

I had been in the headquarters building before, in the heyday of Atari less than three years previous. Back then, the two-story building was amply furnished and positively bustling with activity, as were over a dozen other Atari buildings holding executives, technicians, financial people, and marketers.

In contrast, the corridors and offices of Jack Tramiel's Atari seemed relatively underpopulated. Jack Tramiel's arrival, with its instant layoffs, had been like a neutron bomb: the building had survived but few of the people.

The survivors, explained an amiable young man named Bryan Kerr, were those who had managed to instantly demonstrate that they were ready to adopt the Jack Tramiel "religion." Kerr was speaking as one of two marketing execs in a company that once had legions. "I am doing things that other organizations might have 12 people to do," he told me.

Then Kerr expressed some religion. "I don't want to be smug about it," he told me, "but we're talking major changes in our business. We are talking about what the consumer has been told and trained to believe is a sophisticated business machine, and taking it to the consumer."

Later, Kerr introduced me to two of Jack's sons, Sam and Leonard. Sam, who looks a bit like a younger Jack, is Atari's president; and Leonard, bearded and slim, is a Columbia University Ph.D. in charge of Atari's technology. It was refreshing to see youngsters going into the family business, and the operative word in their explanations of how that happened was "discussions" with the paterfamilias. Knowing Jack Tramiel's reputation for forceful persuasion, I could only imagine what was behind the ironic smiles both sons gave when they spoke the word "discussions."

Both Leonard and Sam gave me their versions of the house religion. "We truly believe we are doing something good for our customers," Leonard told me. "We're fulfilling a true social need." Neither son had much good to say about the rest of the industry, which they generally regarded as a pack of greedy gougers. They insist Atari will do it differently.

"Other people play marketing in setting prices," Sam said. "We look at it from a cost basis. People who sell 'flower' software—that's a ripoff to me."

There is only one company I know that bears the name of a flower and sells spreadsheets for $500. But the Tramiels are as quick to identify rotten fruit as wilted flowers.

"Every time an Apple is sold, the consumer is being ripped off for $600," said Leonard.

Our conversation took place around a table in a conference room that looked, like some Pompeian ruin, as if it had been abandoned in a hurry by the previous occupants. And we were frequently interrupted by a booming laugh in the office next door—Jack Tramiel's laugh.

Happy Jack

It turned out that Jack was in a very good mood that day. He greeted me with a smile as I was ushered into the office. The room was decorated in a modest fashion—no high-tech chrome but with decorations more in the line of trinkets with personal meaning.

The theme of the day was outrageous understatement.

I asked him about the skepticism with which some had greeted his announcements of the low prices, the April shipping date, the high sales projection. His brow furrowed, and he shrugged, an evocative shrug that seemed to dismiss that class of

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people as hopeless nay-sayers who are a burden to us all, and no more. "I am always hearing that," he said. "But *seeing is believing*."

I wondered why, if such power at low price was possible, others hadn't done it before.

"I have very aggressive goals," Jack explained. "I don't think their goals are as strenuous as mine. I like to work hard. My culture is tremendously demanding—not just eight hours a day, but whatever it takes."

We talked about the ST, which seems as geared for business as much as anything. How would a machine like that be sold in Toys-R-Us?

"I am not approaching the purchasing manager at General Motors," said Jack Tramiel. "I am selling personal computers."

What does that mean?

Jack's smile was steady. "I offer a machine to you. What you want to do is up to you."

But what about software? The major companies don't seem to be developing for the ST.

"Why do you have to have the major companies?" Tramiel asked. "All my customers are potential software houses. We are selling to a market of computer-knowledgeable people. They write their own software. They experiment. They send software over the telephone. People will be programming their own computers."

Then he got a little more realistic. "First the enthusiasts will buy. After 100,000 units are sold, developers will write software for it. The third-party developers are like any other businessmen—they want to make money. They know I did it before. And they know damn well I will do it again."

I noted that some people were beginning to compare Atari's new head to Lee Iacocca, the man who turned Chrysler around. Out came Jack's laugh. "I have turned companies around before Lee Iacocca knew what it meant!" he boomed.

We chatted a bit. When I told him I lived in New York City, he recalled his early experiences in that city, trying to make it while living in an apartment with the rent of $13 a month. ("No heat.") I guess there are more astonishing things in the world than a 512K computer for $600.

My final question for Tramiel was when we could judge whether the Jackintosh was a success.

"By the end of June," he told me—"When people are using them."

Rock Bottom Blues

April, as T.S. Eliot and Mitch Kapor well know, is the cruelest month, and the shelves of K Mart and Toys-R-Us saw no Atari STs. A promise broken. And software developers, wooed so intensely in January by Jack Tramiel, were smarting at Atari's insistence that they pay Atari $4500 for preproduction computers. That's no way to build a software base. By the May Comdex in Atlanta, we all figured that Atari had some explaining to do.

> **When he met the press in May Jack Tramiel was all smiles, but serious questions about the still-undelivered ST were brushed off without an answer.**

Jack Tramiel figured differently. He was all smiles at his press conference. Everything, we were assured, was according to plan.

There were a few slight adjustments, of course. Atari's goals were no longer a billion dollars in sales and 5 million machines sold. The shipment date for the ST computers was now July. The computers would *not* be sold in mass-market outlets but computer specialty stores. Which specialty stores? We weren't told.

What about the software, 30 or 40 packages of which were promised to be ready by now? To be shipped when the machine is, said Atari's reps. And yes, there would be a Lotus clone, selling for under $100, but the company developing that software was not the same company working on the product back in January. And almost incidentally, Jack Tramiel began talking of an entirely new computer, a variation of the ST that *would* be sold in mass-market outlets, although he could not name any.

It seemed more than a little confusing, but Jack, smiling like the cat who swallowed the tweety bird, put it in perspective for us: "You people in the press have trouble getting things right," he said.

No one took offense—it was too entertaining. You can get an idea of the level of discourse by considering the following exchange, which occurred when one questioner attempted to find out just who were those 400 companies, according to Atari, developing software for the new Atari machine.

"It's in your press kit, the whole list is in your press kit," said Atari software head Sig Hartman.

"But there's no press kit available," the reporter answered.

Jack Tramiel, at the podium, smiled brightly. "We're saving money," he joked.

We all had a good laugh, but we never did find out who those 400 companies were.

I am not sure that burlesque is the best way to salvage a reputation tarnished by not delivering machines when promised. Neither am I convinced that saving money by not printing sufficient press kits and saving money by not giving machines to software developers is the way to make money in a tough marketplace. It seems more like a form of Rock Bottom Logic.

Yet the promise of the Atari ST—performance for price—is significant in itself. Even if delivered late, the Jackintosh might conceivably have the impact Atari promises. I guess it's a tribute to Jack Tramiel's Commodore track record and the impressive price of his powerful machine that I can't take the step, even now, of writing off the new Atari.

Still, seeing is believing, and so far the game is for believers only. ☐

Steven Levy welcomes your comments and suggestions. You can contact him on The Source (ID TCT670) or CompuServe (ID 72065 635) or by writing to him c/o Popular Computing, POB 397, Hancock, NH 03449.

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Inquiry 10

BY JERRY POURNELLE

Standard Fare

Are standards by committees superior to the home-grown variety?

I was recently asked by a standards organization, the American Society for Tests and Materials, to be the keynote speaker at its annual meeting. The group usually concerns itself with testing procedures, and screw sizes, and chemicals; but it has committees on nearly everything else, and one committee was concerned with producing documents of useful advice to people about to acquire a microcomputer.

This set me to thinking. I don't know how to set standards for micro purchasers, but I can give a good example of how *not* to do it.

Some twenty years ago, John Kemeny and Thomas Kurtz developed a programming language called BASIC. It was an important development. Prior to BASIC, nearly all computer languages were compiled and designed for batch processing: which is to say that in order to construct a computer program, you wrote the program and turned it over to an operator to compile. The operator put it into the machine with a batch of other work, and in due course you got either your compiled program back or, more likely, a printout of error messages which you could use to try to debug your program. BASIC, on the other hand, is interpreted and designed to be used online; you write and test BASIC programs almost line by line and work directly with the machine, asking it questions and getting back instant answers.

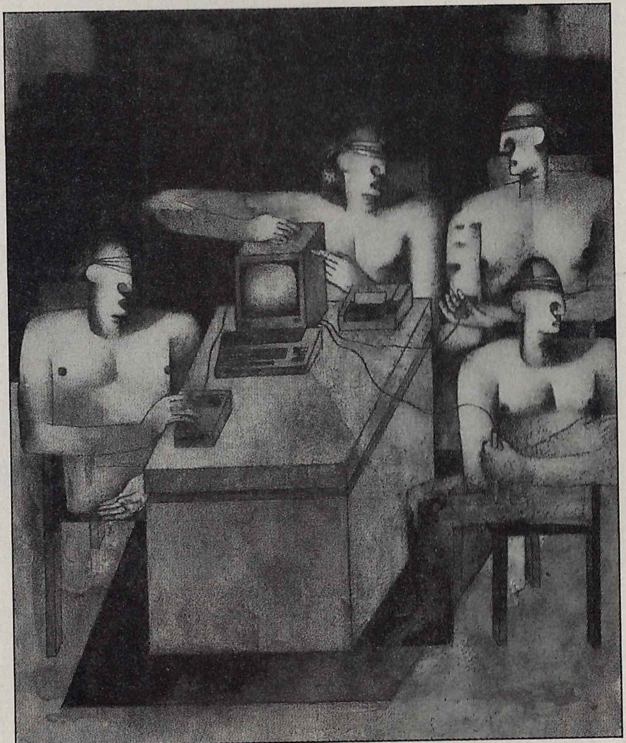

ILLUSTRATION BY JEFF DODSON

Instant Success

Kemeny and Kurtz and their Dartmouth sponsors put the BASIC language in the public domain, where it thrived. BASIC had its problems as a programming language, but it was an instant success with beginners and served as the introduction to programming for tens of thousands of students. Then, when the micro revolution began, Bill Gates and his partners wrote a BASIC interpreter for the Altair computer.

This was a key event. When microcomputers first came out, the only way to communicate with them was painfully to key in programs using front-panel switches. This took a long time and was prone to errors. With Gates's BASIC, though, you could communicate more directly with the machines and make them do useful things like play Star Trek or even do taxes. Gates's early BASIC evolved into the Microsoft BASIC that most beginning computer people now learn.

There were problems in those early days. Microcomputers didn't have much memory. As a result there developed a number of very limited BASIC language implementations. These were usually given away by their authors. They were a lot better than nothing, but they were not very good, and they didn't closely resemble each other. Those were the days when there weren't many other languages for micros, and since it was no little chore to convert a program from one dialect of BASIC into another, the divisions among BASIC dialects really did divide the micro community into incompatible groups.

That all changed when the machines got larger and better. One change was wrought by Adam Osborne, who brought us a de facto standard microcomputer: two disk drives, 64K bytes of memory, a screen (albeit a small one), and keyboard rather than a teletype—and a standard software package. The software included the CP/M operating system, WordStar, and Microsoft BASIC. Prior to Osborne, microcomputers were mostly assembled from components, and software was

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Science fiction writer Jerry Pournelle, who joined the micro revolution eight years ago, is a contributing editor of *Popular Computing*.

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I was recently asked by a standards organization, the American Society for Tests and Materials, to be the keynote speaker at its annual meeting. The group usually concerns itself with testing procedures, and screw sizes, and chemicals; but it has committees on nearly everything else, and one committee was concerned with producing documents of useful advice to people about to acquire a microcomputer.

This set me to thinking. I don't know how to set standards for micro purchasers, but I can give a good example of how *not* to do it.

Some twenty years ago, John Kemeny and Thomas Kurtz developed a programming language called BASIC. It was an important development. Prior to
BASIC, nearly all comp
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bought separately. After the Osborne 1, the typical micro was bought all in one lump, and instead of painstaking systems integration of components, you simply took the machine home and plugged it into the wall.

Moreover, the Osborne settled the matter of BASIC dialects. It came with Microsoft BASIC, and pretty soon so did nearly everything else, and everyone who published a BASIC for microcomputers made it work pretty much like Microsoft BASIC or went out of business, or both.

This cut no ice with BASIC's founders. They saw only the early confusion. To them, "Today's personal computers are large and powerful machines that allow the implementation of a full modern BASIC. Yet the versions most widely used are what are called in the trade "Street BASIC"—a horrible dialect of a beautiful language." Incidentally, I don't know who "the trade" is. I've been involved with microcomputers and micro languages since the beginning, and I never heard the term "Street BASIC" before in my life; but no matter. According to Kemeny and Kurtz a horrible situation had developed among micro people. Something had to be done. High priests to the rescue!

The Standard Solution

In connection with ANSI (American National Standards Institute), which is a private association that seeks to publish and thereby establish standards—and often does much good thereby—Kemeny and Kurtz set forth to construct a truly standard BASIC. (Tom Kurtz, indeed, was chairman of the ANSI committee that seeks to develop a BASIC for the rest of us.) They joined in 1983 with several computing colleagues to found True BASIC Inc., the firm that would oversee the project. The group has been successful in devising a standard they named True BASIC. (See *Popular Computing*, November 1984, page 95.)

Once that was accomplished, far from putting True BASIC in the public domain, Kemeny and Kurtz have not merely copyrighted it but served notice that "the True BASIC system is confidential proprietary information of True BASIC, Inc., to which the affixing of any copyright notice is not an admission of the intention to, or fact of publication." One is, I gather, supposed to accept the legal fiction that the language wasn't really published and ignore the fact that this notice is printed on the copyright page of the manual.

SOMETHING had to be done about "Street BASIC," called by some a horrible dialect of a beautiful language. Enter high priests bearing standards.

Alas, this is more than yet another instance of how silly lawyers can be: for the question inevitably arises, if True BASIC is indeed the one and only true standard, all the rest being "what are called in the trade 'Street BASIC,' " then where in the world did that "standard" come from?

It certainly did not arise spontaneously among micro users. As far as I can tell the ANSI "standard" was developed by a bunch of professors and authors and perhaps some minicomputer users sitting around in a circle and thinking deep thoughts about what BASIC ought to be like; after which the chairman of the standards committee rushed out to write, publish, copyright (more or less), trademark, and protect with trade secret notices "an implementation of BASIC that closely conforms to the proposed national standard."

That, I submit, is how *not* to develop standards for the micro community.

What Can Be Done?

If that's how *not* to do standards, then what *should* standards organizations do?

Good question. The answer may be "nothing."

It isn't that the micro community wouldn't benefit from standard operating systems and a standard way of interacting with the machines; it's just that I doubt seriously if such standards can be imposed by any organization.

Look at the record. When the micro community first began there were literally dozens of operating systems. Then Digital Research, a commercial firm, introduced the CP/M system, which might not have been superior to all the systems then available but did have the great merit of being adaptable to almost all the machines then in existence. Within months CP/M was widespread. Then a few users proclaimed CP/M the "standard of the industry," a statement that was nearly true when made and quickly became even more so. Indeed, so "standard" did CP/M become that there began to appear a rash of cards to allow Apple computers to run it, although Apple had always claimed its own space within the micro community.

Then IBM came along to shatter that tenuous unity and bring in a new "standard." Everyone rushed to imitate: so much so that a couple of years ago I was moved to observe that at the latest Comdex (Computer Dealers Exposition) "even the beer and hot dogs tried to be IBM PC compatible."

Meanwhile, Apple brought us the Macintosh, and what with the new software like Microsoft's Excel to attract business users the Macintosh has a great future, though it's not PC compatible and never will be.

So what, beyond producing meaningless banalities, can a standards organization do? Especially since standards groups, of necessity, move ponderously, while the micro industry leaps ahead to render last year's standards irrelevant? And whose opinions should be solicited by a Standards Committee—those of scientists, vendors, or end users?

Note that in all the above cases whatever standards there were came from private firms out to make sales, not from committees. We can appreciate the need for standards, and the desire of standards organizations to give advice to newcomers, but we must also recognize that not all desirable things are possible.

Still, that doesn't get us any closer to an answer. It's vital to learn how to use computers, yet no one can tell you which computer to learn on. What is a "standard micro"? Is it an IBM PC or PC compatible? An Apple IIe? A Macintosh? An S-100 system? What about the older 8-bit CP/M machines? Clearly there isn't one, and you'd have to be mad to think differently. It's vital to learn computer standards, but there aren't any. What is a "standard language"? Is it True BASIC or Microsoft BASIC? Some other variety of BASIC? UCSD Pascal or Turbo Pascal? Now what should we say the "standard" is?

When I asked for suggestions on what to tell people who wanted to acquire a microcomputer, my fellow speakers at the standards institute meeting gave a variety of answers. You've all heard most of them. "Know what you want to do with the machine before you shop for one." "Visit a number of computer stores. Ask questions. If the store's any good, they'll answer your concerns. Find competent salespeople."

How Can You Know?

All of this sounds little like the stuff of standards and more like splendid advice, but I question its value. In my judgment few people know precisely what they want a microcomputer to do when they first go shopping for one. How could they, when they don't know what's possible. Consequently, most people buy machines for one purpose but discover they spend more time doing other things than the original purpose they bought the machine for. Certainly it was that way with me, and whenever I ask computer-using audiences how many find themselves doing things with their machines that they never expected to do when they went out looking for their micro, the response is generally unanimous.

You can't really know what the machine is to be used for, and if you have no experience with microcomputers, you can't know what questions to ask. Indeed, you can't even determine whether or not the clerks you deal with are competent.

Fortunately, there's a simple answer to the dilemma.

Get a small computer. What kind isn't as important as the fact that you get one. There are some minimum requirements, de facto standards, if you will. You want an "all up" machine, something that simply plugs into the wall and runs without major assembly, and it should come bundled with enough software to do some useful work with it. You'll need two disk drives and at least 64K bytes of memory, but beyond that almost anything will do. The important thing is to start with something and get your feet wet.

> **De facto standards for an "all-up" small computer system call for 64K bytes of memory, two disk drives, and software that serves your needs.**

If you don't have much money, get a used machine. Indeed, this is good advice even for those with plenty of money. Why spend when you don't know what you want? Buy something cheap. You can always sell it again. After all, except for mechanical parts computers don't wear out. We don't know what the normal life of a computer chip is, but it could be very long. Most problems with computers come early in their life cycles as marginally acceptable computer chips give up the ghost. We call that "infant mortality," and the point is that after the infant mortality phase, say six months, the machine is actually *more* reliable than a brand-new one.

Take the Plunge

Get a machine and start using it. If you can't think what else to do, play games with it. The games need not be trivial. As an example, Blue Chip Software (6740 Eton Ave., Canoga Park, CA 91303; 800-258-3244) markets a "game" called Squire that will, in a few days, teach more about compound interest, taxation, and saving for retirement than most college courses. Typing Tutor III (from Kriya Systems/Simon & Schuster, 1230 Avenue of the Americas, New York, NY 10020; 212-245-6400 or 800-223-1360) or another of the "learn-to-type" games will improve typing skills. Even the Infocom (55 Wheeler St., Cambridge, MA 02138; 617-492-1031) adventure games such as Zork can be useful in gaining insights into what can and cannot be done to teach computer programs to recognize plain English.

As you work with the computer, you'll acquire elementary computer skills including word processing, database access, spreadsheets for financial modeling, conferencing and networking, and although not vital, it will be helpful to know how to use some of the complex "aid to thinking" organizational programs like ThinkTank (from Living Videotext Inc., 2432 Charleston Rd., Mountain View, CA 94043; 415-964-6300). That's simply for survival in the next five years.

To get ahead you'll need routinely to use computers for doing job schedules, critical path analysis, calendar and appointment bookkeeping, and more likely half a dozen things I either haven't remembered or which haven't been invented yet.

After a few months you'll have a much better idea of what you can do with a computer; and you'll have a much better idea of what questions to ask when shopping for one.

The microcomputer industry has few generally recognized standards, and by the time any are published, they're likely to be obsolete. The micro revolution continues, and what's most important is to get in on it. If you're waiting for some organization to show you the way, you may miss it completely. □

Jerry Pournelle welcomes comments from members of the micro revolution. Write to him c/o *Popular Computing*, POB 397, Hancock, NH 03449. Jerry tries to answer all his mail but cannot promise individual replies.

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Inquiry 23

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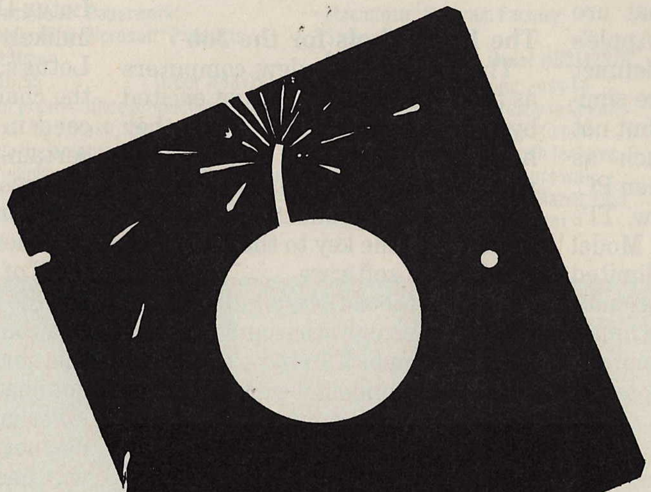
MILLER'S TIME
BY MICHAEL J. MILLER

Rekindling the Fire

As the industry grows up, software, not hardware, will keep the torch of imagination burning

In the early days of microcomputers, the industry shows were a source of great excitement. Over here, you had two guys who built a computer in their garage, a computer that would spawn a billion-dollar company. Over there, you had a former fry cook spouting aphorisms about the marvelous future of personal computers. In the corner, a crazy Englishman talked about bundling hardware and software together in, of all things, a portable computer. For better or for worse, those days are gone. The sort of electricity you could feel in the air no longer permeates the microcomputer industry, as evidenced by 1985's lackluster computer shows. Indeed, one trade paper described the Spring Comdex show as "Calm-dex."



To some extent, that's surprising. After all, lots of new products were displayed on the Comdex floor. Half a dozen firms showed their brand-new AT compatibles. A couple of companies introduced portable computers with more readable screens, made with backlit LCDs or gas plasma displays. And several manufacturers showed plug-in boards that added an amazing 8 extra megabytes of data space to the previous limit of 640K bytes of available memory on an IBM PC or similar machine. Yet, for one reason or another, none of these products lit any spark of enthusiasm.

Why was that spark missing? Was it because many of the products had been announced in the weeks preceding the show? Not really. For most attendees, Comdex was their first chance to see the new products first-hand. Other explanations are more to the point.

First of all, no new players entered the arena. All the major announcements came from expected sources, from established firms like Compaq, Zenith, Lotus, and Intel. If a small firm did come up with an innovative computer today, it would have a hard time taking it to market. Consider the continuing story of the Amiga: a small firm created this brilliant machine, but it couldn't get the money to market it; eventually the company was sold to Commodore, which was able to spend the marketing money, which may convince developers and retailers that the Amiga is for real (see page 11 of this issue).

Today's market demands that firms spend a lot of money for marketing. In part, this situation is the result of the huge amounts of advertising by firms such as Apple, Commodore, and IBM; indeed, that's one reason Apple gives for advertising so heavily—to make entering the market so expensive it will keep other firms out.

As a result, it's highly unlikely we will ever again see two guys building a microcomputer in a garage and turning that into a billion-dollar company. Future heavy-hitters in the personal computer marketplace are probably going to come from corporate America—firms such as AT&T, ITT, Hewlett-Packard, and Sperry.

The absence of new faces may partially account for dull times in the micro market, but another factor is more important and more ominous. The truth is that there is very little hardware innovation in the mainstream business market. AT compatibles are certainly nice, but you can't call them innovation. Most are direct copies of the earlier IBM product with one or two minor improvements. Similarly, most of this year's portable computers are simply enhancements of last year's models, with better screens and a higher degree of compatibility. Incorporating the latest display technologies is a worthy but unexciting development. In fact, since IBM

Michael J. Miller is a West Coast editor of *Popular Computing.*

ILLUSTRATION BY ISTVAN BANYAI

compatibility became the de facto standard for business microcomputers, the technology involved in the hardware has seen very little innovation.

Where there have been new developments, the innovators have found the road to the business market longer and more difficult than they expected. In part, that's because most businesses want standardization, not innovation. They want a machine they can count on for reliability and increased productivity rather than the latest technological wonder from Silicon Valley.

As a result, machines that are radically different—such as Apple's Macintosh and the now-defunct Lisa—and even those that are similar to the IBM PC standard but not completely compatible—such as Hewlett-Packard's Touchscreen PC, Digital Equipment's Rainbow, TI's Professional, and Tandy's Model 2000—have met with only limited success in the general business market. Thus far, of all these machines, only the Macintosh has shown any sign of gaining business acceptance.

Next Year's Model

In the next couple of years, we'll see a number of changes in computer hardware. These include an 80286-based replacement from IBM for the PC; portable computers with more readable displays; higher-resolution monochrome video displays (up to 1024 by 1024 pixels), as well as color displays with many more colors; workstations that combine voice and data communications and processing; and reasonably priced optical disk readers (also called CD ROMs) capable of instantly retrieving enormous quantities of data (such as the contents of an encyclopedia).

All these new products will be introduced with fanfare and trumpeted for their technical achievements, yet they probably won't generate the excitement and sense of adventure we've been longing for.

Why not? Part of the reason is that all these wonders are already givens; we don't need a crystal ball to predict them. They *will* all be part of microcomputers within the next year or two and therefore will not surprise the technology-watchers in the industry.

Another part of the reason is that today's marketplace is quite different from the one that existed five years ago. The people interested in the technology in and of itself are now a distinct minority. Today's typical computer user looks at the hardware with a steady pulse—it's the software that excites him. Nowadays most computers are sold and used simply as tools—tools for word processing, tools for financial analysis, tools for record-keeping, tools for managing a business.

The Right Tools for the Job

The people who view computers as tools are not likely to get excited by changes that make what they have seem outdated. Rather, they want to make their machines more effective, more productive, and more useful. And the key to that is simply good, solid software.

Indeed, the software industry exhibits both innovation and enthusiasm. Last month I wrote about the deluge of wonderful new database programs—programs that are more powerful, easier to use, and capable of doing things that were simply impossible with the previous generation of software.

Innovation is apparent in many other types of programs as well. A number of new programs use decision tree structures to help managers make better choices. These include Lightyear for the IBM PC, Texas Instruments' Arborist for the IBM PC and TI Professional, and Softstyle's Decision Map for the Macintosh. Project management software has also come into its own with programs such as Breakthrough Software's Time Line, Sorcim/IUS's SuperProject, Microsoft Project, Harvard Project Manager, and MacProject.

Work is progressing fast in other areas, often lumped together under the "artificial intelligence" label: natural-language interfaces, expert systems, and voice recognition. And, of course, bit-mapped graphics environments (such as the Macintosh, Digital Research's GEM, Microsoft Windows, and the Commodore Amiga) are letting developers do amazing things with graphics.

In all these areas real innovation abounds and is leading to real changes in the way people work, learn, and manage. And, undoubtedly, over the next few years we'll see programs that use the new hardware in unexpected ways.

What's to Come?

So far at least, the software side of the industry isn't quite as stable as the hardware side and not nearly as stagnant. It is much more open to new ideas. Many firms still harbor the dream of becoming the next Lotus Development Corp. While it's unlikely that any firm will duplicate Lotus's rags-to-riches story exactly, the chances for an unknown to succeed in the software industry are certainly much greater than the chances of overtaking IBM.

To some extent, the software possibilities can bring back some of the thrill of using computers. For example, the most enthusiasm I have seen at a computer show recently was at this spring's Macworld expo, a show dominated by Macintosh software.

Perhaps it was because of the very newness of the software; perhaps it was because people had learned to use the Mac's interface in new ways; perhaps it was because software developers had some unusual products. In any case, the innovation was there, and this rekindled much of the enthusiasm for the Mac.

In similar ways, it's possible that new software can create that kind of enthusiasm for the new, lower-cost graphics machines, the Commodore Amiga and Atari ST. Of course, innovative software is not possible without good machines to run it, and some programs are interesting simply because they take maximum advantage of hardware.

It's surprising, perhaps, that software is getting more attention than hardware now after years of taking a back seat. But maybe it's just a sign that the industry is growing up, paying less attention to flash and more attention to what you can actually do with a personal computer. If that means more and more people will find real, practical uses for microcomputers, then that's a very good sign indeed. □

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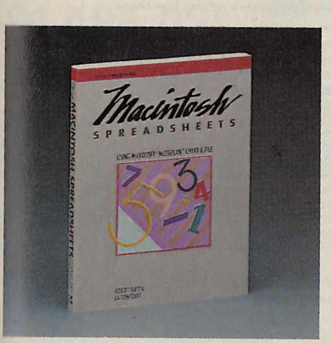

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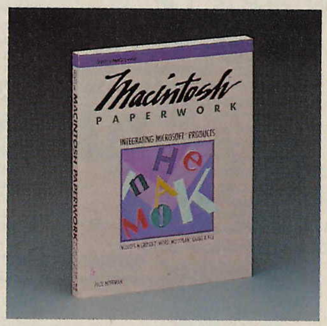

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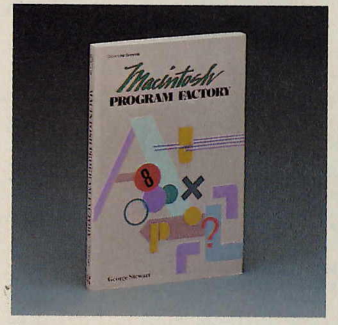

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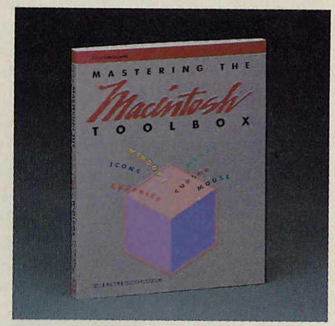

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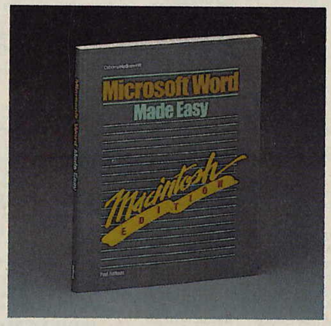

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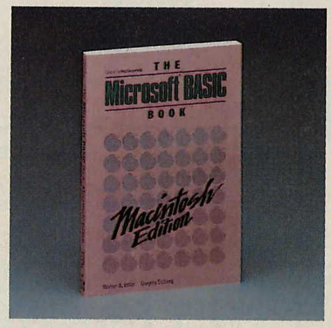

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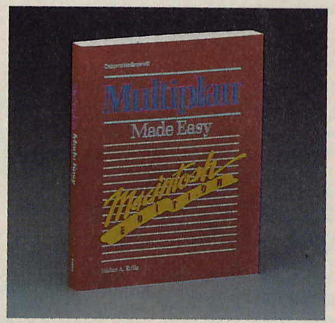

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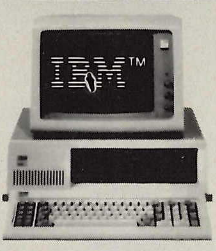

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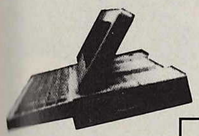

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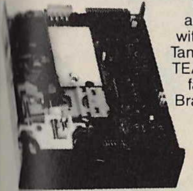

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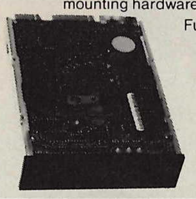

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mo. year

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Address ____________ Apt. No. ______

City ____________ State ____________ Zip ______

Telephone ( ) ____________

My computer(s) is: ☐ IBM PC ☐ IBM-XT ☐ IBM-AT ☐ Apple II ☐ Macintosh ☐ Other ______

Signature ____________
(Signature required to validate membership)

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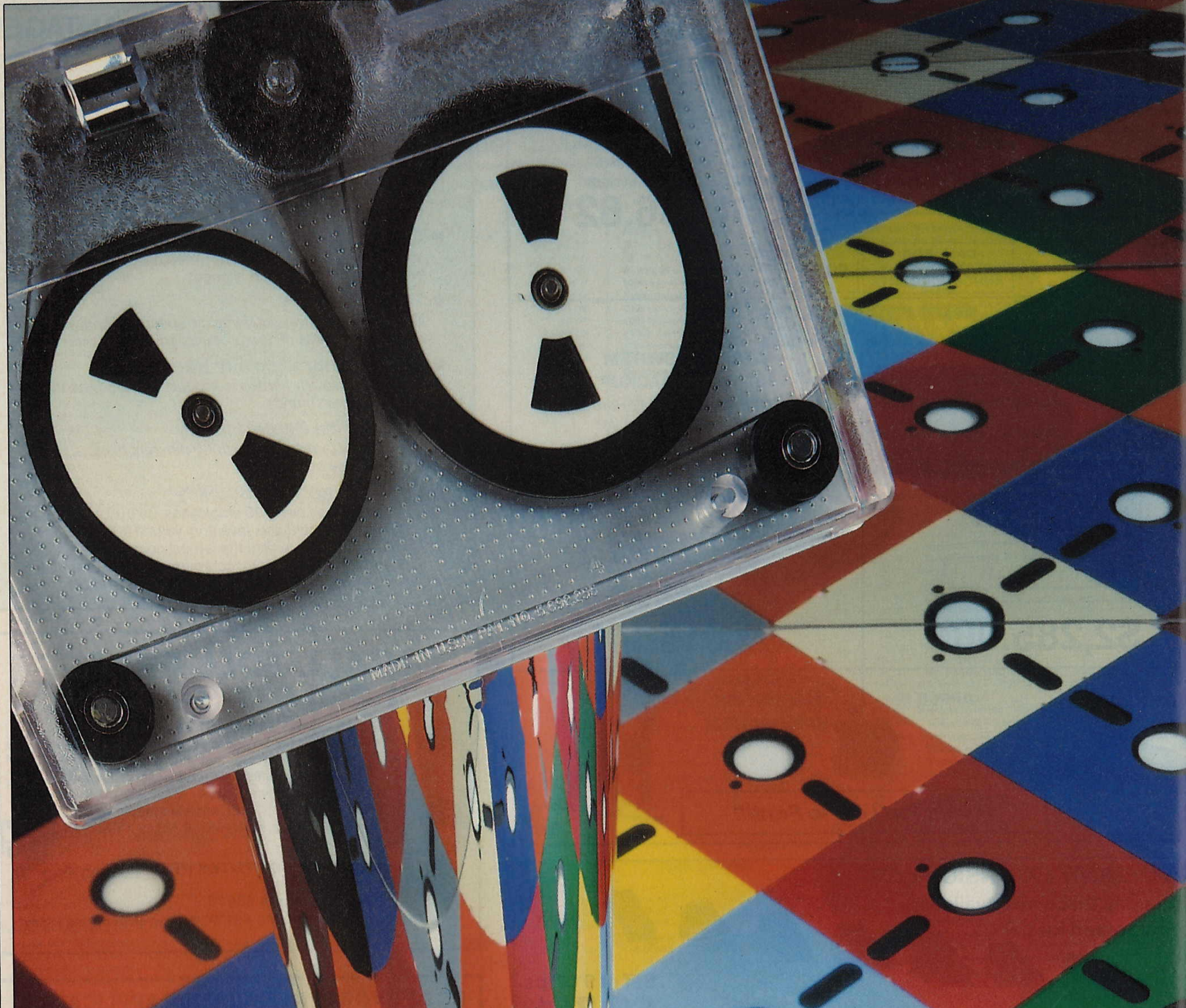
Inquiry 39



Photograph by Victor Schrager

SPECIAL REPORT: PART ONE

HARD-DISK TAPE BACKUP SYSTEMS

With a minimum of planning, these practical systems insure against catastrophe

BY TAN A. SUMMERS

FREQUENT BACKUP OF DATA HAS LONG BEEN A PART OF the routine on mainframe computers, but backup at the microcomputer level—particularly hard-disk backup—is more often a good habit we intend to develop someday, maybe, when we have the time. This is not so surprising since hard-disk backups are traditionally done on floppies—often a two-hour process requiring constant attendance. It's not the sort of job you or your employees volunteer for at the end of a busy workday.

But with 20 million or more bytes of data stored in one place, as is often the case with the larger hard disks now available, there's a lot of information at stake. The data you store is the only irreplaceable element in your whole computer system; it takes only a fleck of dust under a hard-disk head, a power outage, or an operator error such as accidentally reformatting a hard disk to wipe it out. That can mean a month of bookkeeping lost or a payroll missed.

Protecting against data loss isn't the only reason for backing up hard-disk files. You might want to remove sensitive and confidential files from a communally used hard disk and store them separately. Or you might want to transfer infrequently used data to free up space on a particular disk for other applications.

The more frequently you back up, the better. Many people back up their hard disks on a weekly basis, assuming that a week's worth of data can be reconstructed easily if lost. This was the case at one doctor's office when an employee, in a rush to leave on vacation, accidentally erased an entire database of patient records and billing information. Fortunately the disk had been backed up the week before, but the woman spent the first several days of her vacation frantically reconstructing the past week's transactions from appointment books, patient charts, and bank deposit slips.

In situations like this, where the data entered each day is critical, a daily backup is your best insurance against data loss. Keeping a duplicate set of files in a location other than the office offers further protection against major disasters like fire or earthquake. But realistically, the thoroughness of any archival policy depends on the amount of time the backup procedure takes and how easy it is to follow. The least practical and most expensive alternative to the slow and cumbersome floppy-disk backup is a second hard disk. A little less expensive are removable cartridge hard-disk units and high-speed, high-density removable floppy cartridge drives.

Practical Backup

By far the most cost-effective alternative, however, is a quick and reliable tape drive that lets you back up a 10-megabyte hard disk in less time than it takes to drink a cup of coffee. A staple in the world of mainframes, magnetic tape has recently emerged on the micro scene as quite possibly the most practical method yet of hard-disk backup.

Convenient tape cartridges can hold up to 60 megabytes of data, making it easy to back up even very large hard disks. The cost per cartridge is between $35 and $45. The

Tan A. Summers is a regular contributor to *Popular Computing*, most recently in the August issue.

initial cost of the tape drives themselves is reasonable, too, with good-quality systems starting at about $1100. The per-megabyte cost of the tape-only drives tested for this report ranged from $21.58 to $79.75, with combination hard-disk and tape-drive units costing between $41.12 and $71.00 per megabyte of storage. (This looks enticing when compared to the $179.75 per-megabyte cost of a typical 10-megabyte removable cartridge drive.)

Sturdiness is an added advantage: though not indestructible, these backup tape cartridges are able to withstand as much stress as a stereo cassette tape.

Most tape drives aren't quite as fast as transfers between hard disks, but many units back up 10 megabytes in from 3 to 5 minutes. Others take no longer than 10 minutes, still a reasonable length of time for a daily backup. By the end of the summer, one manufacturer, Sysgen, plans to offer a hard-disk drive with an automatic tape backup capability. Such a drive could be set a week in advance to initiate a daily or even twice-daily backup.

High-Tech Tape

Tape backup drives for microcomputers can be freestanding or internal; some brands come packaged with a hard disk in a single case that sits beside your micro. Most come with their own power supplies, a must with the IBM PC, which has a smaller power supply than the PC XT. Some backup systems can be used with either the CP/M or the MS-DOS operating system. The tape is enclosed in a cartridge or cassette, but don't confuse these drives with the cassette drives used with some home computers—these are fast.

The two major kinds of tape drives are start-stop and streaming (continuous). The terms refer to tape motion while recording. The start-stop method allows a file-by-file backup of the disk—useful when only a few files need to be copied. However, the constant interruption of tape motion requires a more expensive motor and slows the procedure.

Improved software allows more continuous movement with stop-start drives, but the faster, less expensive streaming drives are still more popular. Some streaming drives come with software that allows both super-fast "total image" backups and slower file-by-file storage, plus backup of selected files using DOS-like backup commands.

Tape capacity depends on several factors, the most obvious being tape length. The number of tracks the head can read and write and the speed at which data is transferred to the tape are also important. Data transfer speed, and therefore total tape capacity, will be reduced if the hard disk is used in a network because of increased demand on the system as a whole.

Most IBM PC-compatible tape drives have the same system-installation requirements. The computer needs at least 256K bytes of RAM to support the transfer of large blocks of data and version 2.1 or later of MS-DOS (CP/M software is also available). Most units require at least one short expansion slot in your computer, although some merely plug into the external floppy connector on the back of the computer. Combination drive and hard-disk units usually require a long slot, and some use two. You can probably install a tape drive yourself, especially if it plugs into the back of your computer. If your drive package also includes a hard disk, you may want to have a technician install it.

Four original equipment manufacturers provide assemblies for all the major tape drives. Thus, mechanically, they are quite similar. The big difference is in the software. Some programs give you unobtrusive, clear menus or a command set that can be entered using an automatically executing "batch file," making the backup procedure relatively painless. Other software can do selective backups and retrievals of data as well as copying your entire disk.

Selection options are usually patterned after those provided by the DOS BACKUP command. With them you might, for example, copy all files modified since the last backup or just those written since last Thursday. This saves time, since only those files that really need to be backed up are actually copied onto the tape. In some cases it also speeds up retrieval of the file from tape. A drive limited to the backup and restoration of an entire disk section, or "partition," must be very fast in order to be practical on a day-to-day basis.

Behind the scenes, software can improve operation speed through creative use of memory buffers and directories. How a system handles data verification is also a software function that directly affects speed. Some systems verify data during the recording process ("on the fly"), where each data block is checked and rewritten if necessary. Other systems use a separate command that compares the tape record with equivalent disk files or that makes verification during the backup procedure optional.

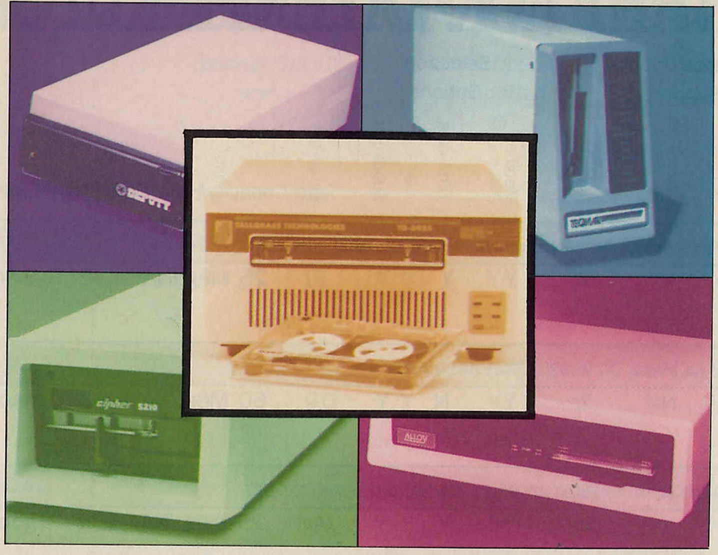
Which Backup Hardware to Buy?

There's no question that you need some means of backing up your hard disk other than a stack of some 30 floppy disks. However, what you should buy depends on a number of factors. If you're buying your first hard disk, or if you need additional on-line storage beyond your present hard disk's capacity, you'll save money by purchasing a combination hard-disk plus tape backup unit. The initial cost of a disk plus tape unit containing 20 or 25 megabytes of hard-disk storage and providing between 25 and 60 megabytes of backup storage is about the same as the cost of a 20-megabyte removable cartridge drive.

If, however, you want a backup for an already installed hard disk—particularly a large one—a tape drive is your best buy. Choose a tape drive with more storage than you think you'll need. Even if you match your tape and hard disk on a meg-per-meg basis, you can't be sure you'll get the maximum amount of data on each tape. The software should make backing up easy, whether it uses menus or batch-file commands. If your computer is short on expansion slots, consider a drive that plugs into the external floppy controller.

As for performance, in the following Buyer's Guide we've evaluated the most popular tape systems to help you get the backup you need as painlessly and as cost-effectively as possible. □

SPECIAL REPORT: PART TWO



BUYER'S GUIDE

A market survey of tape backup systems and combination hard-disk and tape systems

FOR OUR REVIEW OF TAPE BACKUP SYSTEMS, WE COLLECTED 17 different units from 12 manufacturers. We attached each tape system to an IBM PC XT with 256K bytes of RAM and ran them through identical tests to determine speed, flexibility, and overall ease of use. The XT's 10-megabyte hard disk was filled to about 98 percent of its total capacity with approximately 1000 files in 10 subdirectories. To maintain uniformity while testing, combination hard-disk/tape-drive units were tested with the same amount of data regardless of the size of the second hard disk. If your computer has more than 256K bytes of RAM or if your hard disk is faster than the XT's—which isn't difficult—your backup times will probably be shorter than ours.

Speed is almost always an important consideration, but flexibility and ease of use are the key criteria for ranking tape drives. In fact, most of the systems we tested fell into only two speed categories: the faster drives, Tecmar, Archive, and Maynard, did a complete "image backup" of 10 megabytes in 3 to 5 minutes. The slower drives, Tallgrass, Cipher, Davong, and others, took 9 minutes. Such uniformity within each category isn't too surprising when you take a closer look at the anatomy of the drives. Of the 17 units, 5 contained identical Cipher hardware, 5 had Archive insides, and 4 had drive mechanisms by 3M. All but one drive, the Maynard Maynstream, used a 3M Scotch DC-600A tape cartridge.

The real differences showed up when we tried out each system's software options. The MS-DOS hard-disk backup command offers a choice of parameters to help make both backing up and restoring data easier. For example, you can save time and tape or disk storage space by backing up only files that have been changed since the last backup or which were written after a certain date. You can also back up or restore a set of related files or an entire subdirectory. When you restore a backup created under DOS, you can have the computer check before overwriting a hard-disk file that has been changed since the backup was made.

The tape systems we tested ranged from units that offered practically all of the DOS options—Tallgrass, Genie, Tecmar, and Mountain, to name a few—to units that had none, like Emulex and Tandberg. In some cases—Sysgen, Archive, and Genie, for instance—an image backup (always the fastest to create) could also be used for selective file-by-file restoration. In a few others, like the Maynard MaynStream, a separate and usually time-consuming file-by-file backup was necessary to make selective restoration possible later. In general, in creating backups, the more options the better, although there are some circumstances (for example, when the disk is used for a single application only) where a very fast image backup performed daily is all that's needed. The biggest drawback to an image-only backup is that in some cases it may not be possible to transfer the image to a different hard disk in case of a total hard-disk failure. With most systems, if the tape fills up, the backup can be continued on

COMPARISON CHART FOR TAPE BACKUPS

Product Name	Price	Backup Speed (min.)		Other Options Supported			Selection Options			Tape Capacity/Hard Disk Size	Ease of Use
		Image	File-by-file	Menus	Batch Files	Multiple Volume	Modified	Time-date	Subdirectory		
ALLOY/MICROSYSTEMS 100 Pennsylvania Ave., Framingham, MA 01701; (617) 875-6100											
MT25	$1050	9.0	NA	Y	Y	Y	Y	Y	Y	25 Meg./NA	average
ARCHIVE CORP. 3540 Cadillac Ave., Costa Mesa, CA 92626; (714) 641-0279											
FasTape 60	$1500	3.0	NA	Y	N	Y	Y	N	Y	60 Meg./NA	poor
CIPHER DATA PRODUCTS 10101 Old Grove Rd., San Diego, CA 92138; (619) 578-9100											
Model 5210	$1095	9.0	16.0	N	Y	Y	Y	Y	Y	25 Meg./NA	good
DAVONG SYSTEMS 217 Humboldt Court, Sunnyvale, CA 94089; (408) 734-4900											
Davong System Tape	$1695	9.0	9.0	Y	Y	Y	N	N	Y	24 Meg./NA	average
GENIE TECHNOLOGY CORP. 31117 Via Colinas #402, Westlake Village, CA 91362; (818) 991-6210											
Jetstreamer	$1795	6.0	NA	Y	Y	N	Y	Y	Y	60 Meg./NA	average
MAYNARD ELECTRONICS 430 East Semoran Blvd., Casselberry, FL 32707; (305) 331-6402											
MaynStream	$1595	3.0	NA	Y	Y	Y	Y	Y	Y	20 Meg./NA	below average
MOUNTAIN INC. 300 El Pueblo Rd., Scotts Valley, CA 95066; (408) 438-6650											
FileSafe	$1595	5.0	16.0	Y	Y	Y	Y	Y	Y	27 Meg./NA	very good
TALLGRASS TECHNOLOGIES 11100 West 82nd St., Overland Park, KA 66214; (913) 492-6002											
TG-4046 Hardfile	$1995	30.0	72.0	N	N	Y	Y	N	Y	60 Meg./NA	below average
TANDBERG DATA 1590 South Sinclair, Anaheim, CA 92806; (714) 978-6771											
Deputy	$1295	4.0	NA	Y	N	N	N	N	N	60 Meg./NA	good
TECMAR 6225 Cochran Rd., Solon, OH 44139-3377; (216) 349-0600											
QIC-60H	$2144	3.0	19.0	Y	Y	Y	Y	Y	Y	60 Meg./NA	excellent

another tape. If not, the software will warn you that you need to insert another tape and start over.

The real heart of the matter—ease of use—lies beyond speed and flexibility and encompasses both. If backup commands are difficult to remember and use, it's not likely that you'll make backups as a routine part of your workday, even if the backup doesn't take long to complete. The systems that provided good, workable menus—Tecmar and Mountain are the best of these—were easier to use than those that required the user to memorize a set of complicated commands, as did Tallgrass, among others. But menus aren't enough. The ideal backup software also allows commands to be stored in a batch file, to be issued all at once with a single command.

One last factor should be mentioned, although it doesn't really affect a drive's quality. Systems such as Sysgen, Tallgrass, Tecmar, and Alloy allow you to store more than

AND COMBINATION HARD-DISK/TAPE SYSTEMS

Product Name	Price	Backup Speed (min.)		Other Options Supported			Selection Options			Tape Capacity/Hard Disk Size	Ease of Use
		Image	File-by-file	Menus	Batch Files	Multiple Volume	Modified	Time-date	Subdirectory		
ALLOY/MICROSYSTEMS 100 Pennsylvania Ave., Framingham, MA 01701; (617) 875-6100											
PC QIC-STOR	$4595	9.0	19	Y	Y	Y	Y	Y	Y	60 Meg./36 Meg.	average
DAVONG SYSTEMS 217 Humboldt Court, Sunnyvale, CA 94089; (408) 734-4900											
Datasystem	$3195	9.0	9.0	Y	Y	Y	N	N	Y	24 Meg./21 Meg.	average
EMULEX CORP. 3545 Harbor Blvd., Costa Mesa, CA 92626; (714) 662-5600											
Javelin	$5495	12.0	NA	Y	N	N	N	N	N	60 meg./53 Meg.	good
MOUNTAIN INC. 300 El Pueblo Rd., Scotts Valley, CA 95066; (408) 438-6650											
FileSafe Combo	$3495	5.0	16.0	Y	Y	Y	Y	Y	Y	27 Meg./20 Meg.	very good
SYSGEN INC. 47853 Warm Springs Blvd., Fremont, CA 94539; (415) 490-6770											
Sysgen XL	$3295	5.0	NA	Y	Y	Y	Y	Y	Y	60 Meg./20 Meg.	average
TALLGRASS TECHNOLOGIES 11100 West 82nd St., Overland Park, KA 66214; (913) 492-6002											
TG-5025 Hardfile	$3495	7.0	30.0	N	N	Y	Y	N	Y	60 Meg./25 Meg.	below average
TECMAR 5225 Cochran Rd., Solon, OH 44139-3377; (216) 349-0600											
QIC-60W20	$3495	3.0	19.0	Y	Y	Y	Y	Y	Y	60 Meg./60 Meg.	excellent

one backup on a tape, keeping track of the volumes with a directory like the ones on your floppy disks. Others, like the Emulex, Genie, and Tandberg systems, automatically record from the beginning over the previous backup each time so that each backup must be kept on a separate tape. Each system has its good points and its drawbacks. The multivolume method lets you adequately archive your hard disk with fewer tapes, but you have to wait while the system searches through the tape for the end of the last backup.

One-volume-per-tape systems, on the other hand, make you shuffle tapes during the week, but there's no waiting. Some systems allow both, using a selection parameter to determine whether the old backup will be overwritten or not.

■ ALLOY/MICROSYSTEMS

MT 25 *25-megabyte tape backup drive, $1050*

PC QIC-STOR *36-megabyte hard disk with a 60-megabyte tape backup drive, $4595*

MICROSYSTEMS MAKES A VARIETY of tape backup and hard-disk units for both large and small businesses. We tested the MT 25, a 25-megabyte tape drive that plugs into the external floppy port on the IBM PC or XT. It contains a Cipher drive mechanism and backs up 10 megabytes in 9 minutes. The tape must be formatted before use. A full range of options are available either through sketchy menus or as part of an autobackup command file. The documentation provides good instruction and examples for both backup and restoration. Microsystems' combination units range from 36 to 170 megabytes of hard-disk storage with a tape capacity of 60 megabytes. The QIC-TIP software that comes with the PC QIC-STOR disk plus tape backup unit provides the ability to selectively back up any file from the hard disk, including those in subdirectories or only those recently modified; provision is also made for batch-file operation.

■ ARCHIVE

FASTAPE 60 *60-megabyte tape backup drive, $1500*

ARCHIVE MAKES THE DRIVE MECHanisms for some of the fastest systems we tested, but the software

—Continued on page 120

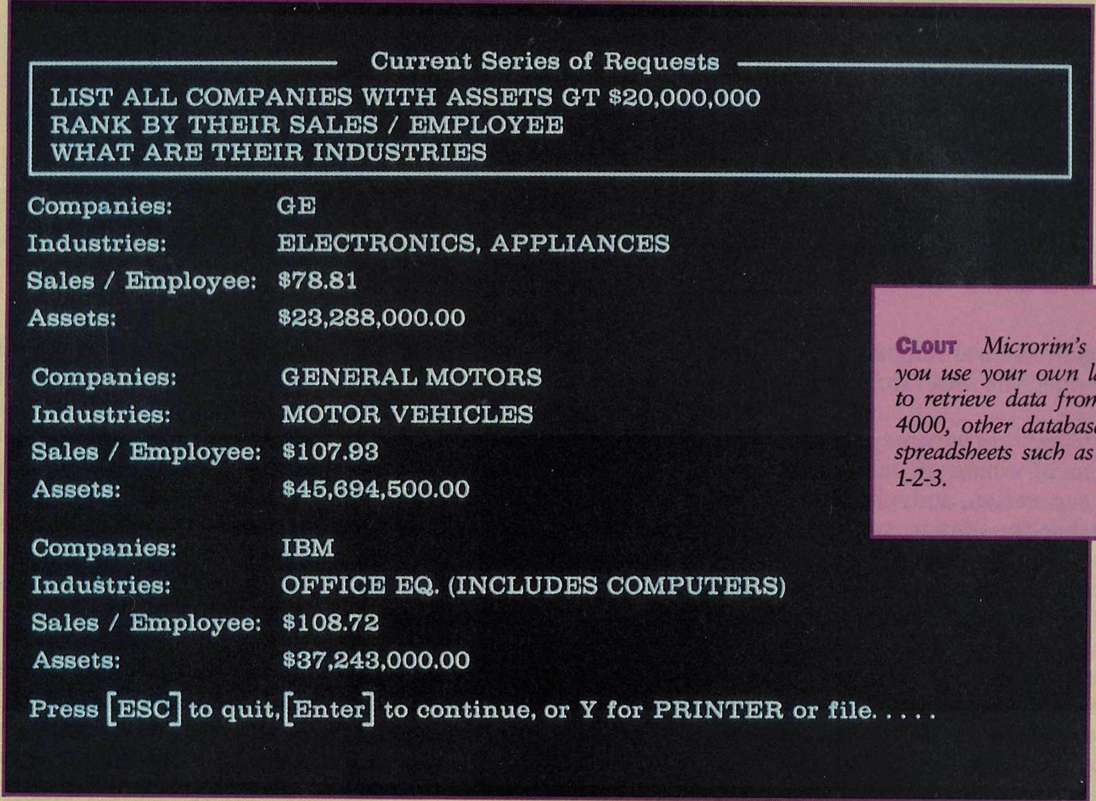
Putting NATURAL to Work

BY DOUG STEWART

CLEAR COMMUNICATION IS ESSENTIAL to working efficiently. It stands to reason, then, that if we could communicate with computers in plain English, the way we do with coworkers, we'd boost our efficiency. We wouldn't have to spend hours mastering the command sequences required by high-powered business software. To that end, manufacturers are promoting what they call "natural-language" software, programs that let you "talk" to sophisticated business applications in more comfortable language. And though computers still can't match the linguistic comprehension of a four-year-old child, these programs have advantages that make them worth investigating.

Special interfaces let your software understan

ANGUAGE



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─────────────── Current Series of Requests ───────────────
│ LIST ALL COMPANIES WITH ASSETS GT $20,000,000
│ RANK BY THEIR SALES / EMPLOYEE
│ WHAT ARE THEIR INDUSTRIES
Companies:          GE
Industries:         ELECTRONICS, APPLIANCES
Sales / Employee:   $78.81
Assets:             $23,288,000.00

Companies:          GENERAL MOTORS
Industries:         MOTOR VEHICLES
Sales / Employee:   $107.93
Assets:             $45,694,500.00

Companies:          IBM
Industries:         OFFICE EQ. (INCLUDES COMPUTERS)
Sales / Employee:   $108.72
Assets:             $37,243,000.00

Press [ESC] to quit,[Enter] to continue, or Y for PRINTER or file. . . . .
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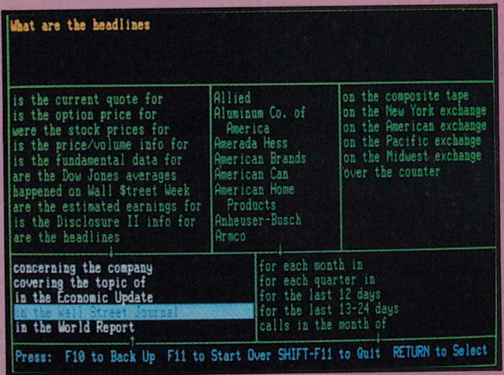
CLOUT *Microrim's Clout lets you use your own language to retrieve data from R:base 4000, other databases, and spreadsheets such as Lotus's 1-2-3.*

What these packages do is let you replace commands that tend to be decidedly unnatural—finicky combinations of control keys, numbers, slashes, dots, and semicolons—with English words and phrases. Instead of calling up information from a database by typing "LIST ALL COMPANIES, STATE, SALES84, FOR STATE = 'FL' .AND. SALES84 > 30000000," for instance, as dBASE II demands, you can type in a question such as "Which companies in Florida have sales over 30,000,000?" or perhaps simply, "Florida sales over 30,000,000?"

By far the most common application for natural-language programs is database querying—searching for a particular name or number from a complicated library of stored information—but other uses, such as business accounting, are turning up. Many of these programs work in tandem with software like WordStar or Lotus's 1-2-3, allowing you to bypass their intricate rules and commands. A few packages even let you do your own pro-

d English commands. Can fluency be far behind?

The benefit: they make spreadsheets, databases, and other software simpler to use. The drawback: they're slow.



1

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What are the headlines

is the current quote for          Allied                  on the composite tape
is the option price for           Aluminum Co. of         on the New York exchange
were the stock prices for           America               on the American exchange
is the price/volume info for      Amerada Hess            on the Pacific exchange
is the fundamental data for       American Brands         on the Midwest exchange
are the Dow Jones averages        American Can            over the counter
happened on Wall $treet Week      American Home
are the estimated earnings for      Products
is the Disclosure II info for     Anheuser-Busch
are the headlines                 Armco

concerning the company            for each month in
covering the topic of             for each quarter in
in the Economic Update            for the last 12 days
in the Wall Street Journal        for the last 13-24 days
in the World Report               calls in the month of

Press:  F10 to Back Up  F11 to Start Over SHIFT-F11 to Quit  RETURN to Select
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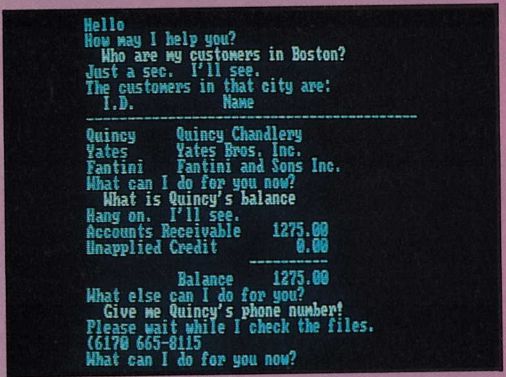

2

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Hello
How may I help you?
  Who are my customers in Boston?
Just a sec.  I'll see.
The customers in that city are:
  I.D.           Name
--------------------------------------
Quincy     Quincy Chandlery
Yates      Yates Bros. Inc.
Fantini    Fantini and Sons Inc.
What can I do for you now?
  What is Quincy's balance
Hang on.  I'll see.
Accounts Receivable    1275.00
Unapplied Credit          0.00
                     ---------
          Balance      1275.00
What else can I do for you?
  Give me Quincy's phone number!
Please wait while I check the files.
(6170 665-8115
What can I do for you now?
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gramming in natural language.

The products fit into two categories:

- menu-driven programs where several lists of words appear on the screen in succession, and, phrase by phrase, using the cursor, you build commands that your computer readily understands.
- English-command-driven programs that let you type questions and commands in your own words. The software translates your words internally into commands recognizable by the computer.

Menu-driven Programs

Natural-language software that presents you with menus works much like an automatic cash machine or a computer chess game. You keep making choices from the options put before you. Texas Instruments takes this approach in its Natural Link programs, which are companions to such best-selling software packages as 1-2-3, dBASE II, WordStar, Multiplan, and BPS Business Graphics, as well as MS-DOS and Dow Jones News/Retrieval. (The Natural Link programs run on TI Professional computers with 512K bytes of RAM. The Dow Jones program costs $150, and the others sell for $75.)

In each Natural Link program, the words "I want to" permanently glow at the top left corner of the screen. Windows appear on the screen, each containing a list of choices, and the cursor automatically hops from window to window, waiting for your selection. With the Natural Link companion to dBASE II, for example, if you start by choosing "create" from the first list, the next list shrinks to a choice of one, "a database named ____________," and you are asked to type in a name. As you make your selections, the words chosen from each list are highlighted, and the English sentence you are constructing appears step by step in a box at the top of the screen.

The big advantage of the Natural Link approach is that you're never left staring at an A> or—equally intimidating—a question like "What would you like to do?" on an otherwise blank screen. Since you are choosing from a list of acceptable commands, it is impossible to give an illegal command or make a syntax error. That alone should attract many frustrated computer users.

For me, being reprimanded by my IBM PC because I've used an illegal command is an everyday annoyance. I find MS-DOS a particularly user-hostile operating system. The index in one of my manuals, for instance, lists 12 different page references for the word "copy." I suppose I could take a few hours and study the manual, but at this point I'm too alienated to bother. On the other hand, with the Natural Link add-on program for MS-DOS, I can dispense entirely with commands such as "Diskcopy *.* b:" and calmly choose words and phrases with my cursor from lists that appear before me in an orderly sequence. A sample: "I want to—copy—both sides of the disk in—drive a—to—drive b—and check the accuracy of the copy."

Natural Link also makes it easy to explore an application program's options. How many people learn a few general commands like "copy" and "print" and never experiment with a program's more sophisticated features? Exploring with Natural Link is painless because all your options appear on the screen; as long as you don't hit the return key, you can shop around in a program's command structure, backing up at will and try-

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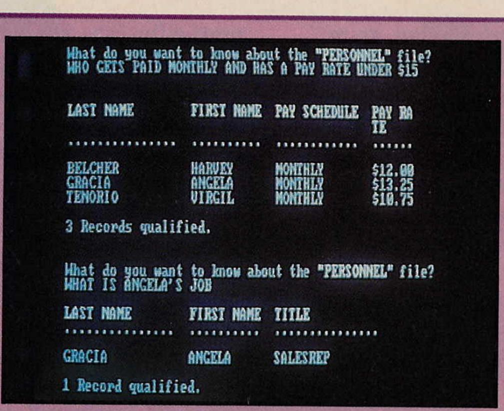
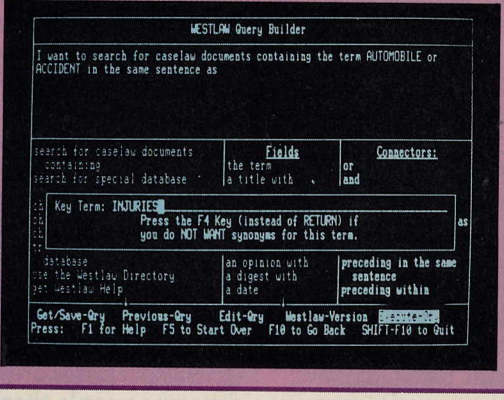
Doug Stewart is a freelance writer in Ipswich, Massachusetts. His last article for us—"Whatever Happened to the Electronic Cottage?"—appeared in the July issue.

3



```
What do you want to know about the "PERSONNEL" file?
WHO GETS PAID MONTHLY AND HAS A PAY RATE UNDER $15

LAST NAME         FIRST NAME  PAY SCHEDULE  PAY RA
                                            TE
...............   ..........  ............  ......

BELCHER           HARVEY      MONTHLY       $12.00
GRACIA            ANGELA      MONTHLY       $13.25
TENORIO           VIRGIL      MONTHLY       $10.75

3 Records qualified.

What do you want to know about the "PERSONNEL" file?
WHAT IS ANGELA'S JOB

LAST NAME         FIRST NAME  TITLE
...............   ..........  ...............

GRACIA            ANGELA      SALESREP

1 Record qualified.
```

4



```
                    WESTLAW Query Builder

I want to search for caselaw documents containing the term AUTOMOBILE or
ACCIDENT in the same sentence as



search for caselaw documents |       Fields       |     Connectors:
  containing                 |the term            |or
search for special database  |a title with        |and

   Key Term: INJURIES
             Press the F4 Key (instead of RETURN) if                as
             you do NOT WANT synonyms for this term.

 database                    |an opinion with     |preceding in the same
use the Westlaw Directory    |a digest with       |  sentence
get Westlaw Help             |a date              |preceding within

Get/Save-Qry  Previous-Qry   Edit-Qry   Westlaw-Version  Execute-Qry
Press:  F1 for Help  F5 to Start Over  F10 to Go Back  SHIFT-F10 to Quit
```

1
NATURAL LINK *Texas Instruments' Natural Link Dow Jones makes it easier to retrieve information from Dow Jones News/ Retrieval databases. To build a query, you select a series of phrases with the cursor.*

2
CASH MANAGEMENT SYSTEM *Safeguard Business Systems' Cash Management System consists of two packages—accounts payable and accounts receivable—that let small businesses use free-form commands.*

3
SAVVY PC *The Savvy Corp.'s Savvy PC offers you free-form database querying. The package's programming language also lets you construct databases and write programs with the help of English-like commands.*

4
LAWSEARCH PLUS *Direct-Aid's LawSearch Plus, like the Natural Link programs, gives you a series of phrases that you use to construct queries. LawSearch Plus works with the Westlaw legal database.*

ing a different branch. Each word selected from a list will summon up another window with more choices.

Thus it's theoretically possible to find every command in a system just by trial and error rather than reading a manual. And there's a bonus—the conventional command that corresponds to each Natural Link command (the one you'd have to type if you used the application program directly) appears in one corner of the screen. In Natural Link for MS-DOS, for example, as you piece together "I want to create a new directory named misc," you'll notice that the phrase "mkdir misc" appears to one side. If you were so inclined, you could use Natural Link as a tutorial for your application program.

Unfortunately, the multiple-choice approach to getting work done can be frustratingly slow, especially for those who already know how to do it with direct commands. Consider the Natural Link companion to WordStar. This word-processing program is cumbersome enough when used as intended. Moving a block of copy from one place to another takes 15 keystrokes, counting each cursor movement as one keystroke. A more streamlined program like XyWrite takes only six keystrokes for the same operation. Natural Link WordStar makes you hit the keys 26 times, and that's if you don't make any mistakes along the way.

Cumbersome maneuvers are not the only drawback of these programs. The meanings of choices at each step of the Natural Link WordStar menu are not always obvious, so you sometimes end up exploring just to find the right commands. If you want to remove the markers that clutter your text after you've moved a block of text, you have to select "reset" (but not "change," "clear," or "delete," all of which are just as plausible), followed by "the display," then "of the marked block (on/off)." That may be language, but it's not natural. The regular WordStar command is quicker and no less obvious.

The question arises: who is a menu-driven natural-language product aimed at? TI talks about the benefits of Natural Link to both "new and experienced users," but it's unlikely that an expert user would bother with clumsy menus. Harry Tenant of Texas Instruments' Computer Science Lab in Austin, the man who came up with the Natural Link system, admits that Natural Link is best suited for the occasional user. "If you learn a query language today and don't use it for two months, you're liable to forget it," he says. In such a case, he notes, menus can come in handy. "But people who are doing a job nine to five everyday and are real experts at it probably—certainly—need a different sort of interface [from Natural Link]."

Ed Weiner, a lawyer with Pillsbury, Madison, and Sutro in San Francisco, is perhaps a typical Natural Link user. He uses a program called LawSearch Plus, developed with Natural Link technology by Direct-Aid (Boulder, CO), to pull information out of the Westlaw legal database. "I'm not a regular computer user, I'm a lawyer," says Weiner. "Using LawSearch Plus, I don't have to constantly look things up in the database manual."

Colorado attorney Tom Birney of Bradley, Campbell, and Carney in Golden, is another LawSearch Plus user, but he's less enthusiastic. "I'm not sure it's particularly useful for someone already familiar with Westlaw syntax," says Birney. Because wading through a query-building menu is slow, he says, most of the people in his law firm simply use LawSearch's so-called expert mode. This feature lets them bypass the menus altogether by using a one-keystroke command and simply typing in conventional commands as before. (LawSearch Plus runs on the TI Professional, IBM PCs, and compatibles with 256K bytes of RAM and costs $495.)

Indeed, menus are an awkward way to accomplish tasks, especially those that are straightforward to begin with. With the Natural Link products in particular, there is a delay of several seconds whenever the screen must conjure up a new window of words, and when you already know what's coming next, even a short delay can be irritating. I like the Natural Link companion to MS-DOS because I hate to read the DOS manual, and the Natural Link companions for other programs might be appealing for similar reasons.

Say It in English

The second approach to natural-language software is considerably more flexible. You type in a question or command, the software analyzes it, and (within the limits noted here) the computer responds accordingly. Most such programs work by incorporating linguistic rules and models that have filtered down from artificial intelligence research done on mainframes.

The software uses the rules of English grammar and syntax to parse, or split into components, each phrase you type. A rule-based program has no trouble recognizing that "cities" is related to "city," that "earn" is a verb and "earnings" a noun, and that "their" must have an antecedent somewhere. A sentence is processed according to a set procedure: individual words are broken down into their basic forms, the structure of the sentence is analyzed, and input words are compared with a vocabulary stored in memory.

Software packages that allow free-form English-language commands include Clout from Microrim (Bellevue, WA), the Cash Management System from Safeguard Business Systems (Fort Washington, PA), and Savvy and Savvy Retriever from The Savvy Corporation (Albuquerque, NM). Several other firms, notably Symantec (Cupertino, CA), plan to enter the market soon.

These products are targeted for a number of uses, but foremost among them is database querying. Databases lend themselves to a natural-language approach because users are often not database savvy; they are apt to be people in need of a quick answer to a question. Querying a database tends to be a good deal more complicated than telling WordStar to delete a sentence, and asking "Which 10 employees in Los Angeles had the highest sales in January?" is a lot easier than typing an awkwardly structured formal query.

Getting Stuck

The big drawback of free-form query languages is that, without menus to choose words from, you have to compose sentences from scratch, and you can easily get stuck. Much of the time, the video display is blank except for a prompt such as "What do you want me to do now?" or "The following expression was encountered: ____________. Quite frankly, I am confused. Could you please redo your request?" Most programs have an automatic vocabulary-building feature to help you around this latter problem: when a program doesn't understand a word, it either makes a guess and asks if that is correct, or it asks you to define the term with words already in the program's vocabulary.

To understand how the process works, imagine that you have a database of a company's personnel records and you'd like to find out when each person was hired. Using Clout, a natural-language companion to Microrim's R:base series and other database managers, you can work your way through a few introductory menus and arrive at a screen where the program asks what you'd like to know about this particular database. (You can also use the menus to ask to see the vocabulary list, the database itself in its entirety, or a help menu.)

At this point, you're on your own—you have to type something. Every time you make a request using a word Clout doesn't know, it offers a three-way choice: delete the word, correct its spelling, or offer a synonym, which it can then store. The saving grace of all this work is that your changes are entered automatically into the system.

The Clout tutorial suggests, for example, that you enter either "Show me a list of employees and when they were hired" or "Employees when hired?"—Clout will interpret both requests as the same question. But when I type in, "Let's see a list of workers and the dates they started here," Clout asks, "By 'see' do you mean 'sex'? (Y/N)." More machine questions follow: What do I mean by "workers"? What do I mean by "dates"? By "here" do I mean "her"? Evidently, Clout's built-in dictionary of several hundred words is not big enough to avoid the need for a certain amount of preliminary tinkering. Once I define "dates" as "when" and "workers" as "employees" and delete the other problem words, the program displays the proper list.

As with menu-driven programs like Natural Link, software like this is not suitable for everyone. The ads and brochures stress that Clout and similar packages are easy to use. But for some people these programs are harder to use—slower and clumsier and less precise—than the application programs they accompany.

"We see Clout as being for people like the department manager who walks up to a terminal to get an answer for someone on the phone," says Mark Skeel, a corporate services officer at Boston's Shawmut Bank. His department has been using Clout with its database management programs. Clout would not be a timesaver for an expert computer user, he points out, because of the clumsiness of defining synonyms. "Clout's not as natural as we had hoped," Skeel says, "but we'll continue to buy Clout upgrades, if only to encourage Microrim."

Tom Mahon, an applications developer for the U.S. Army Corps of Engineers in Champaign, Illinois, has also worked with Clout. "If you've set up the database yourself and have chosen the field names and so on," he says, "then you can get stuff out of it so quickly you don't really need Clout." Some of the non-expert users in Mahon's office use Clout occasionally, but often, he notes, these people simply ask an expert to retrieve the information they need. (Clout costs $249 and runs on IBM-compatible computers with 256K bytes of RAM.)

—Continued on page 123

THE FINE ART OF DATA TRANSFER

HOW TO MOVE DATA OUT OF ONE PROGRAM OR COMPUTER INTO ANOTHER

BY ALFRED GLOSSBRENNER

THE MUCH-LAMENTED LACK of standards in the fractured microcomputer industry often causes us to mutter and complain. And that muttering rises to a roar when we try to move data out of one program or computer and into another for further work.

Sometimes it's simply impossible to export the information from a database-management program into a spreadsheet or to import the figures from a spreadsheet into a business graphics package. Frequently it's easier to retype an entire file than to figure out how to transfer it intact to another program or computer.

Because of the long-entrenched lack of standards, we'll have to live with the problems of incompatible files for years to come. But given the right tools and a bit of ingenuity, you often can transport data back and forth with relative ease, regardless of the machines, disk formats, or application programs involved. The transfer will not always be perfect, and you'll sometimes have to do a little post-transport tinkering on the receiving machine or program. But usually that will take far less effort than completely rekeying the data by hand.

Oddly perhaps, differences in disk size and format are the easiest to overcome (see "Different Disks, Different Machines" on page 73). Moving information from your spreadsheet into your database-management program and from there into your word-processing program is usually the greater challenge. The best way to meet that challenge is to follow a disciplined, organized series of steps. If you plunge in without a plan, you can end up so confused that you'll never attempt the process again.

We'll present the steps you should take in a moment. But to move information developed

TITLE DESIGN BY GERARD HUERTA

in Program A into Program B successfully, it's essential to understand a few things about how the programs store data in files.

THE UNIVERSAL CURRENCY: ASCII

Text and data files fall into one of two categories: machine-language files or ASCII (American National Standard Code for Information Interchange) files. Both consist of binary numbers, sequences of 1s and 0s. The difference is that binary numbers in a standard ASCII file represent text and numbers people can read and understand, while binary numbers in a machine-language file represent instructions that only the computer can read. Machine-language files make sense to us only when they are interpreted and displayed by an application program.

This difference is crucial because most programs cannot read and interpret the machine-language files created by another program. Consequently, if Program A can store its data only in machine-language files, it's probably impossible to import that data into Program B. On the other hand, most application programs can read and understand ASCII files, so if you can find a way to get the data into an ASCII text file, you're in business.

The ASCII code, one of the few common denominators of the computer world, is simplicity itself. The code assigns a number to every upper- and lowercase letter, every number from 0 through 9, and each of the most commonly used punctuation marks. (These ASCII code numbers, converted to binary form, are what ASCII files are made of.) The standard ASCII code runs from 0 through 127; the first recognizable character, the exclamation point, appears at 33. The codes from 0 through 32 are primarily control codes, with Control-A at 1 and Control-Z at 26. These codes represent functions like a carriage return (Control-M) or line feed (Control-J). Other control codes represent a space, backspace, form feed, or tab; one code generates a beep or rings a bell.

If all programs that store text or data in ASCII files used only the standard ASCII codes from 0 to 127, the procedure for transferring files would be considerably less complex. But in the binary system, only 7 bits are required to represent those codes, and all computers have at least 8 bits to work with. That means they can represent numbers as large as 255 and can generate an additional 128 ASCII codes.

Computer manufacturers and software producers use these additional codes for a variety of functions. As you might suspect, they do not agree on what each of these "high codes" (from 128 through 255) should mean. On IBM and Commodore computers, for example, the high codes represent different graphics characters, while on the Apple, codes 128 through 255 simply repeat the characters assigned to codes 0 through 127.

Software producers often use high codes to symbolize information that is important to a specific program. In MicroPro's WordStar, a high code marks a "soft hyphen"—one that the program automatically inserts or removes whenever you adjust your text to a particular margin setting. Other programs use high codes to store files more compactly. Microsoft BASIC, for example, automatically stores your programs in a compressed format by using high codes to symbolize BASIC instructions.

ASCII files that use high codes are intended solely for the program that created them. Although you may have put nothing but text into them, they can be as unreadable to other programs as machine-language files are. Fortunately, programs that use high codes usually also offer a straight ASCII, pure-text option. And if an ASCII option is not available, you can use other techniques to convert the files into pure ASCII text files.

THE FORMAT OF ASCII FILES

The way in which a program or computer uses ASCII codes is the first factor to consider when you want to transfer files, and when you're transferring files between two word-processing programs, it's sometimes the only factor you need consider.

But with other types of application programs, a second and equally important factor is how data is arranged, or formatted, in a file. To keep track of a file of customer addresses, for example, a database management program must know where each address record begins and ends and where each name, state, zip code, or other field within each record begins and ends.

The simplest way for a program to track this information is to use an ASCII character as a marker. Some database programs mark the end of each record in a file by inserting a carriage-return character (ASCII 13) or a carriage return paired with a line feed (ASCII 10). Each data field in the record is typically separated from its neighbor with a comma. Text fields are usually bracketed with double quotation marks to make it possible for you to use commas as part of your database information.

ASCII files with this type of formatting are

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often called "comma-separated value" (CSV) files. They are sometimes known as "delimited files" because each field is delimited with a character, usually a comma. And because each field and record can be any length you specify, files of this type are also called "free-format" or "variable-length-record" files. The program simply counts the commas to know where it is within a record or a file.

Other programs, including Ashton-Tate's dBASE II, take a different approach to tracking fields and records. Instead of counting commas, they count characters. For all dBASE data files, for instance, you must specify the names and lengths of each field. If you specify 15 spaces for the LNAME (last name) field, dBASE allots 15 space characters (ASCII 32) for that field. Whether it contains any data or not, the length of the LNAME field in every record is always 15 characters. The same is true for all other fields in the database. For this reason, files with this type of format are called "fixed-length" or "fixed-format" files.

All this information on ASCII files and data formats is more than inconsequential jabber. Consider it survival training. With this foundation, you'll be able to create an ASCII file acceptable to your target program, a technique you'll need when all else fails. And even if you needn't create an ASCII file, this information will make it much easier to take advantage of other available options. We'll consider these options now, moving from the easiest to the most difficult.

STEP ONE:

LOOK FOR A TRANSLATION OPTION

Whenever you want to import or export files, the first step is to look for a file-translation module that comes with the program from which you want to export data. Lotus's 1-2-3, for example, has a Transport option on its main menu. Like many other programs, 1-2-3 uses the file extension popularized by the target program to refer to a particular data format. Thus the option to go from a 1-2-3 worksheet (.WKS) to a dBASE data file (.DBF) is "WKS to DBF". You also can move information into 1-2-3 from dBASE and bring in complete spreadsheets from VisiCalc as .VC files. Another option lets you export and import information as DIF files.

DIF (Data Interchange Format) is one of four specialized formats that have emerged as "standards" for data files. All four—DIF, SDF, SYLK, and SDI—are types of pure ASCII text files. But perhaps the most widely used is DIF, a set of specifications for storing spreadsheet data drawn up in the late 1970s by Software Arts, the creator of VisiCalc.

When VisiCalc or another spreadsheet program stores data in a DIF file, it adds such words as "vectors," "tuples," "data," and "BOT" (beginning of tuple) to the file. Vector is a fancy name for a column, and tuple ("two-pull") for a row. In each case, these words are followed by the appropriate numerical data or labels from the spreadsheet. Any program that supports the DIF format can accept data from another DIF-supporting program and insert it into its own spreadsheet.

But DIF files are limited: they cannot transport the formulas attached to cells in a spreadsheet. SYLK (Symbolic Link) files, however, can contain formulas in addition to data. Originated by Microsoft, the SYLK format is usually associated with that firm's Multiplan spreadsheet.

SDI (Super Data Interchange) is an extension of the DIF format invented by Sorcim Corp., creator of SuperCalc. Like SYLK files, SDI files can transfer both spreadsheet data and formulas. SDF (System Data Format) files, made popular by Digital Research and the CP/M operating system, are like dBASE II files: they consist of fixed-length records (no commas). But they contain a carriage return and a line feed at the end of each record.

Obviously, the transfer problem is most easily solved if your source program offers an option specifically designed to export a file in the format that your target program requires. Equally ideal is a target program with flexible import options, as you'll frequently find in business graphics programs. Graphics programs use data from other types of application programs, and consequently they often support a variety of formats. Condor Graf 2.0, for example, a graphics program for IBM PCs and compatibles and CP/M computers, accepts data formatted as a DBF, DIF, SDI, CSV, SYLK, or ordinary ASCII file. It also accepts files from Condor's database program, from SuperCalc 3, and from at least four other commercial programs for a total of a dozen different formats.

Only recently has it been possible to find the same flexibility in a database management program. One of the leaders here is the FileGateway utility supplied with Microrim's Clout. In addition to accepting DIF, SYLK, and ASCII files, Clout accepts files created by

dBASE II, 1-2-3, PFS:File, and the company's own R:base 4000 and 5000. FileGateway creates a copy of the original file and translates it into an R:base format, leaving the original untouched. Once translated, up to 40 files can be combined into a single database.

By including Translate as a selection on its main menu, 1-2-3 highlights its export capabilities. Other programs have similar capabilities, but they're not as obvious and you may have to dig into the manual to discover them. If you hunt around dBASE II's manual, you'll find that the program can export files in the SDF format or in a format using virtually any character you specify as a delimiter. The key command here is COPY TO, followed by the dBASE file name, then SDF or DELIMITED WITH and your chosen delimiting character. (You may use both SDF and DELIMITED WITH if appropriate.)

Suppose, for example, you wanted to create a WordStar MailMerge file using customer addresses you entered in dBASE. As the WordStar manual points out, MailMerge requires files in which each field is delimited with a comma. If your dBASE file is called CUSTADS.DBF, you would go into dBASE and enter the following:

```
USE CUSTADS
COPY TO M-MERGE DELIMITED WITH ,
```

The program would then create a file called M-MERGE.TXT which you would use when specifying the data file you want MailMerge to use (.DF M-MERGE.TXT).

But if neither Program A nor Program B offers satisfactory import-export options and if your forays into their respective manuals come to naught, the answer may lie in a third program.

Illustration by Gerard Huerta

STEP TWO:

LOOK FOR AN AUXILIARY PROGRAM

If you own an IBM PC or compatible with a hard disk and at least 320K bytes of RAM (512K bytes would be even better), you might want to consider Desq, from Quarterdeck Office Systems. Desq lets you open as many as nine windows, each of which can contain a different application program. Literally hundreds of commercial programs can be used with Desq.

Desq lets you use the import file formats most major application programs support. Alternately, you can directly transfer data from one window to another without translation from one format to another; such transfers are easy to perform. In June, Quarterdeck began shipping Desq 2.0, an improved TopView-influenced version offered at $200, half the cost of the original. Quarterdeck has also announced Desq View, a stripped-down version of the program available for $99.95 through computer retail stores or by mail directly from the company (Quarterdeck Office Systems, Suite 240, 1918 Main St., Santa Monica, CA 90405; (213) 392-9851 or (800) 845-6621).

One of the few software houses that specializes in data translation and transfer products is DataViz. The company offers a "data bridge" consulting service for especially difficult and large-scale problems. For simpler tasks, the firm suggests OneShot, a program for users of

—*Continued on page 118*

DIFFERENT DISKS, DIFFERENT MACHINES

Of all the possible problems you encounter when transferring data, disk format and physical differences among machines are the easiest to overcome. If you have an IBM PC at the office and a Kaypro II at home, you are undoubtedly aware that the two machines cannot read each other's disks. However, if you want to transfer the report you started on the Kaypro to an IBM disk, a program such as Uniform or Xeno-Copy will do it in a flash.

Both programs can generate more than 100 different disk formats. When using Uniform on an IBM PC, you merely tell the program that you want Drive A to be the IBM drive and Drive B to be the Kaypro II CP/M drive. Then you copy the file to Drive B just as you normally do. Xeno-Copy works much the same way.

Uniform sells for $69.95, plus $3 for shipping and handling and is available from MicroSolutions (125 South Fourth St., DeKalb, IL 60115; (815) 756-3411). Xeno-Copy is a product of Vertex Systems (6022 West Pico Blvd. #4, Los Angeles, CA 90035; (213) 938-0857) and sells for $100. An enhanced version, Xeno-Copy Plus, sells for $150. The company also offers a program called Hypercross ($150) for transferring TRS-80 (all models) files to IBM or CP/M formats. And it offers Apple Turnover, a plug-in board and disk package that lets an IBM read and write Apple-formatted disks.

If you have a Macintosh and an IBM PC or compatible, a file-transfer and -translation program like MacLink from DataViz may be the answer. With MacLink, you can move WordStar files into MacWrite files with underlining, bold, shadow, subscripts, superscripts, and other formatting preserved. Spreadsheets are translated and transferred with their formulas, functions, and data intact. MacLink can transfer 1-2-3 or Multiplan spreadsheets from an IBM into a form suitable for the version of Multiplan running on the Mac. Similarly, the program can transfer IBM WordStar or Multimate files to the Mac in a form suitable for use with MacWrite. In both cases, you can go in the opposite direction. The program supports DIF, ASCII, and binary-file formats.

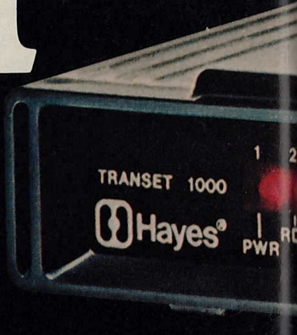
Both machines must be equipped for telecommunications, either by modem or by direct cable connection. The MacLink package consists of a Macintosh disk, an IBM disk, and a manual and sells for $125. An 8-foot cross-over cable is available for an additional $30.

Another way to overcome disk format and other machine-related incompatibilities is through telecommunications. Both machines must be equipped with RS-232C interfaces and communications software.

If you can place the two machines next to each other, you can dump files back and forth via a direct connection. The main advantage here is speed: you can transfer as fast as 9600 bits per second, versus the usual 1200 bits per second. The only caveat is that you will need a properly sexed null-modem cable to connect the two machines. A null-modem or cross-over cable is wired to fool both machines into thinking they are talking to a modem. You can get one from your dealer or contact a firm like B&B Electronics (POB 1008H, Ottowa, IL 61350; (815) 434-0846) for a null-modem converter plug ($19) that will let you use your present cable.

If you cannot bring the two machines together, consider transmitting your file via telephone and modem to CompuServe, MCI Mail, The Source, or some other system that can be used as an intermediary. A file transmitted by one computer can be downloaded (received) by any other computer. You might also consider establishing a modem connection with the remote computer and sending the file directly, though this means, of course, someone will have to be on hand at the other machine.

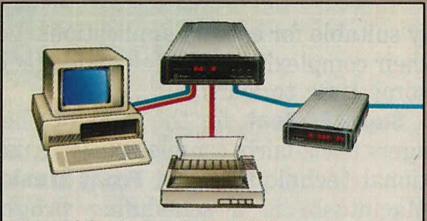
Introducing The Single Solution To Many Problems That Can Tie Up Your Personal Computer.



Transet 1000™ The print buffer, communications buffer, port expander, printer sharer and I/O switcher. All in one.

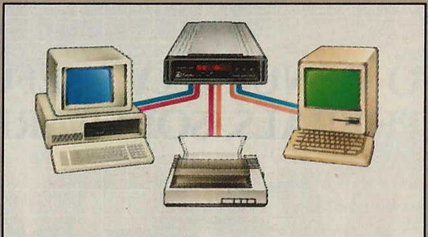
Anyone with a personal computer and one or more peripherals has faced the all-too-familiar dilemma. You need your computer to do an important job. But you're forced to wait for the system to finish one job (printing, communicating, whatever) before you can go on to the next one. Or you need to stop what you're doing to switch cables when you want to use another peripheral.

Wait no more. Now Hayes introduces an innovative new device that lets you perform many jobs—at the same time—independent of your computer. Transet 1000. It works with a wide range of systems and configurations. And it allows you to continually expand your system as your needs grow.



Even while printing, Transet 1000 acts as a communications buffer and 24-hour mailbox. And I/O switching lets you route information among peripherals, without switching cables.

Transet 1000 frees your computer from waiting on your printer or modem—so you and your computer can go on to another task. It even lets you print out documents in pre-set formats without having to go back into your computer. At the same time, Transet 1000 can operate unattended mailbox communications—24 hours a day—even if your computer is turned off.



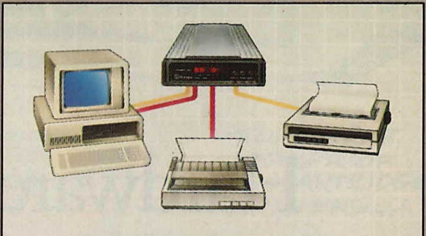
Two computers can share one printer with Transet 1000. Or, you can use Transet 1000 to let two computers communicate with each other.

In addition, Transet 1000 is a port expander and software-controlled I/O switcher. Now files can be easily directed and redirected to different peripherals, without physically changing cable connections.

Transet 1000 contains a stand-alone microprocessor, and comes with 128K of memory. It operates with any RS-232 interface computer, and has optional accessory kits available for the IBM® PC and PC XT, Macintosh™ and Apple® IIc. Kits contain the necessary host cable, a user guide and menu-driven software that lets you graphically set up or customize port parameters and printing formats. Cables available for IBM PC AT, other computers and peripherals.

Like all Hayes products, Transet 1000 combines sophisticated capabilities with easy operation. Just as Hayes set the standard in personal computer communications, now Hayes is taking the lead in computer task management.

Contact your authorized Hayes dealer to see how Transet 1000 can help you get a lot more productivity out of your computer system—without tying up your computer or you.



Transet 1000 allows printing on both a dot matrix printer and letter quality printer, while freeing your computer for other tasks.

Hayes Microcomputer Products, Inc., P.O. Box 105203
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Inquiry 21

POPULAR REVIEWS

YOUR GUIDE TO GENUINELY USEFUL COMPUTER SYSTEMS, PERIPHERALS, SOFTWARE, AND BOOKS

Hardware

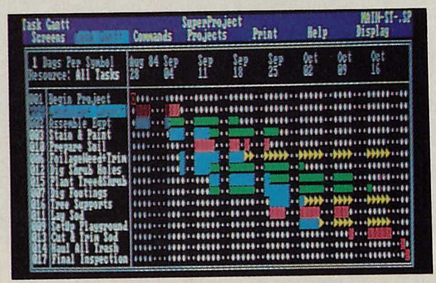
The IBM PC AT is impressive, but already rivals are cropping up that offer genuine enhancements such as greater speed, larger disk capacity, more memory, and lower price. This month, we test three of the most exciting new **286-generation systems** now available.

—DENNIS ALLEN

The DeskPro 286 from Compaq runs with an 8-MHz clock.

Software

The great wheels of corporate America turn on organized information. This month we look at four programs that go a long way toward helping you achieve the organization you need.



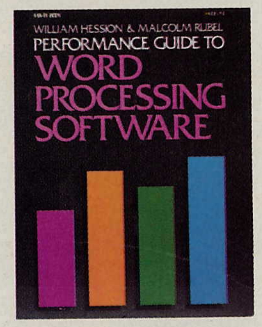
SuperProject tracks complex tasks.

Helix and **MacLion** are both powerful relational databases for the Macintosh. Helix makes full use of the Mac's icon system and desktop environment, putting a sophisticated tool within the reach of professionals and managers who may not be conversant with high-end database programs. MacLion, on the other hand, relies more on keyboard commands, and its programming language makes it particularly suitable for custom applications. Because of their complexity, both Helix and MacLion take some time to learn.

SuperProject, for the IBM PC, helps managers track fairly complex projects using traditional techniques. And **Front Desk**, for the Macintosh, is a scheduling program that supervisors can use to monitor the activities of office personnel and the assignment of rental equipment.

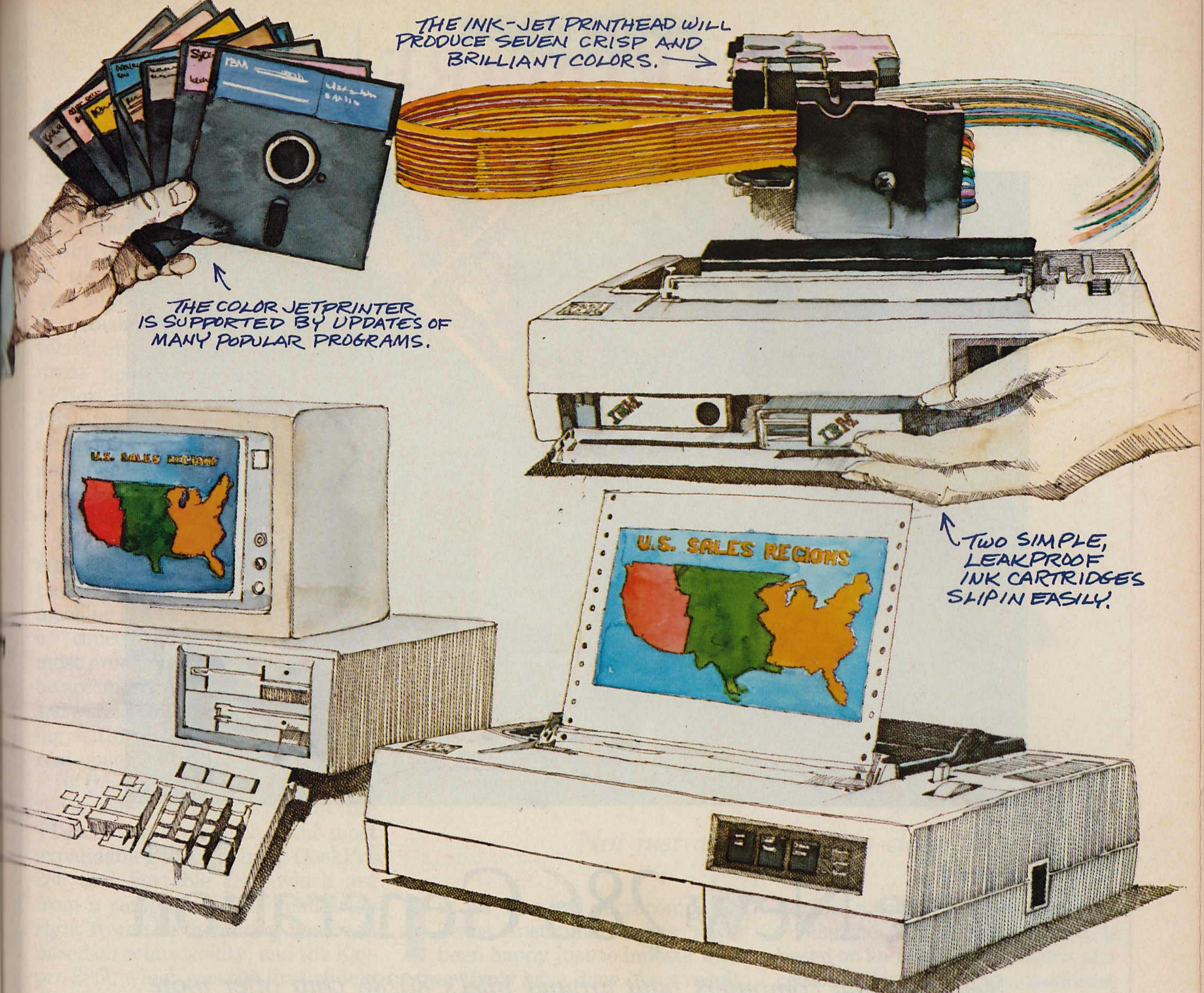
This month we also review **WordPerfect 4.0**, the latest version of this best-selling business-oriented word processor for the IBM PC.

—BEVERLY CRONIN



Books

Selecting the right word processor for personal use is not a big problem—you know what you need and what you like. But when it comes to choosing a product that will be used throughout a business, missing the mark even slightly adds up to a considerable loss of productivity. It's for this reason that business people will be interested in this month's review of **Performance Guide to Word Processing Software**, a book that helps you find the best word processor for your particular work. Also, Micro Reviews cover new titles on dBASE III, PC-DOS, telecommunications, and more. —TOM MCMILLAN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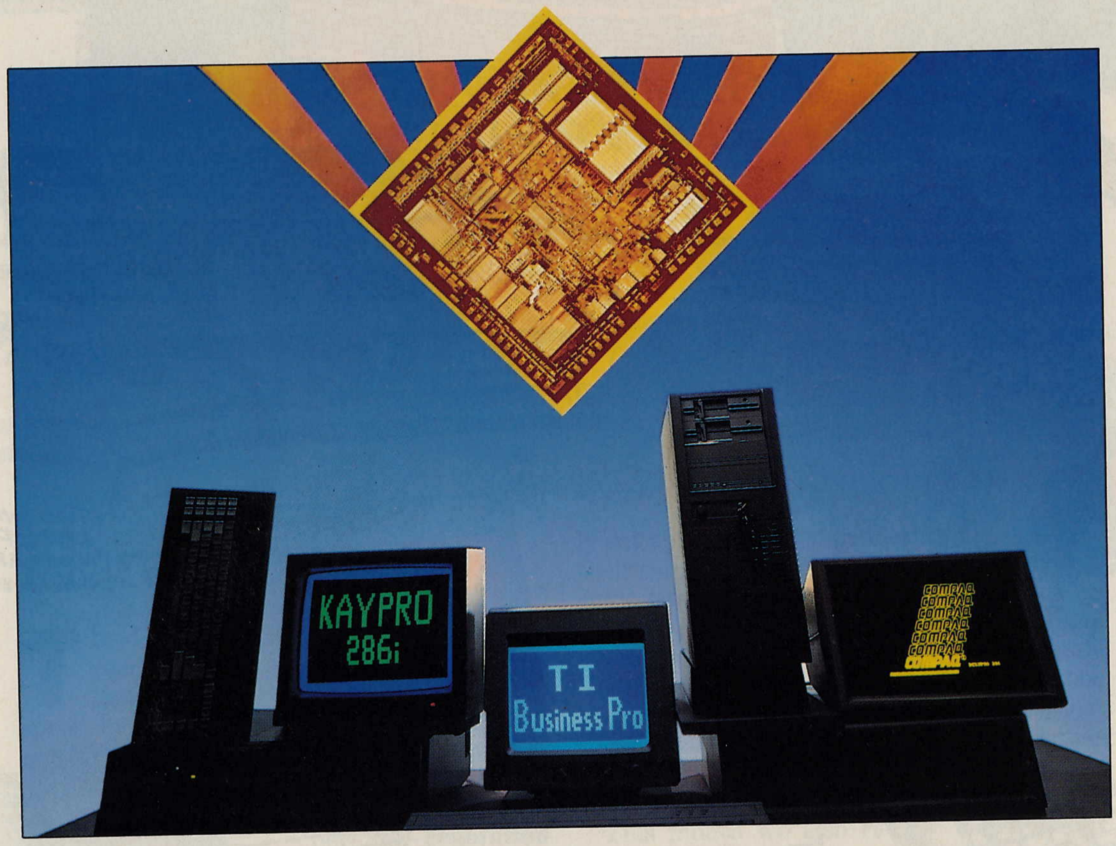

The New 286 Generation

New personal computers built around Intel's 80286 chip offer more memory, speed, and disk capacity than any other MS-DOS hardware to date. This month we look at three machines with special promise.

A slow-moving but important change is underway, led by the IBM Personal Computer AT. Last year when IBM introduced that machine, most of the computer world hailed it as a souped-up IBM PC and they were half right—the AT does work as a high-performance PC. But there's more to the story.

The AT is a sophisticated system with a state-of-the-art 80286 (often called 286) central processor. As with any new computer system, however, exploitative software for the AT has also been slow in coming. In the meantime, other computer manufacturers, recognizing the potential power of the AT yet realizing the importance of compatibility, have developed systems similar to the AT but with more features, better performance, or lower cost.

This new generation of 286-based computers, including the AT, is engineered for more memory, greater disk capacity, enhanced flexibility, and greater speed than the present crop of MS-DOS machines. These advantages, as well as several others, stem directly from the Intel-developed central processor at the core of the new units.

The 80286 is compatible with the 8088 used in the PC—think of the 80286 as having a built-in 8088 processor. This link to the 8088 is the key to software compatibility with the PC. Without that compatibility, the 286-generation would only collect dust while waiting for new software to be developed.

Operating in its 8088-compatible "real mode" with a data path twice the size of the 8088's, the 80286 performs up to six times faster than

Photograph by Ryszard Horowitz

an 8088. It also runs at a faster clock rate, typically 6 MHz instead of 4.77 MHz, and sends and retrieves twice as much data at the same time, further contributing to the 80286's impressive performance.

But those features are the least of the processor's capabilities. It also supports virtual memory and multitasking. Operating in its "protected mode," the processor can address up to one gigabyte—a full *billion* bytes—of virtual memory. With the proper operating system and additional hardware, a software developer could create programs that use a seemingly endless amount of memory.

While in the protected mode, the 80286 processor can also switch tasks, a necessary function if the machine is to support multiple users or concurrent applications. With most processors, task switching can be accomplished only with additional software; being able to do the switching within itself gives the 80286 a real speed advantage.

In this month's issue, we review three 286-generation systems: the TI Business Pro, which is the most expandable; the Compaq DeskPro 286 and Portable 286, which are from a company whose reputation right from the beginning has been based on compatibility; and the Kaypro 286i, which was the first widely distributed AT-compatible.

But how do you adequately test a new generation of computers when the new generation of software is still waiting in the wings? We looked at systems first as super-MS-DOS computers—which, for the moment, is what they are—checking for compatibility with the major application programs written for the PC, programs such as WordStar, Flight Simulator, Lotus's 1-2-3, Symphony, Microsoft Word, the PFS: series, GEM desktop, and Sidekick. Next, we ran benchmark tests for performance comparisons with the AT, looking at factors such as disk read and write speed, text string-handling speed, and raw number-crunching ability. And finally, we studied the inner workings of the machines and made educated guesses about future software compatibility.

—DENNIS ALLEN

THE 286 GENERATION

TI Business Pro

Not just another pretty clone

In its line of microcomputers Texas Instruments has never been happy just to imitate what other firms have done. As a result, the company has created some machines that were technically impressive yet unable to run much of the software available for its competitors—chiefly the IBM PC family.

Software developers offer over 900 programs for TI's Professional Computer, but that number pales in comparison with the thousands written for the IBM PC and its compatibles. More important, most of the well-known programs came out first for the PC and some (such as Lotus's Symphony) have never ever been available for the Professional.

With its newest computer, the Business Pro, TI is taking no chances; the machine is compatible with both software and hardware designed for the IBM PC AT. But the firm has not settled for making a pure "AT clone." It has included features that, added together, make the Business Pro one of the most flexible machines on the market.

Like the AT, the Business Pro is based on an Intel 80286 central processor and is faster and can address more memory than earlier 8088-based microcomputers like the TI Professional or IBM PC. And like the AT, it runs version 3.1 of the MS-DOS operating system. But beyond that, there are notable differences.

Not only can the Business Pro run software developed for the IBM PC AT, it can also run most programs developed for the TI Professional. It retains the major advantage of the earlier TI machine—a graphics display resolution of 720 by 300 pixels with eight colors, as opposed to the IBM standard of 640 by 200 pixels with only four colors. Also, compared to the AT, the Business Pro is faster, can address more memory, has a greater mass storage capacity, a better monitor and keyboard, more option slots, and, as a multiuser machine running the Xenix operating system, it can accommodate more users.

PHOTOGRAPH BY RYSZARD HOROWITZ

Hardware Specifics

On the surface, the machine is markedly different from the AT and other 286-based microcomputers. It is designed as a tower that can sit under or adjacent to a desk. The keyboard and optional optical mouse plug into a tilt-and-swivel monitor that goes on your desktop.

Inside it is also markedly different. Perhaps the most unusual aspect of the machine is its ability to emulate both the TI Professional and the IBM PC AT. The engineers at TI accomplished this feat with two optional monitor adapter boards.

The PC-AT board emulates both IBM's monochrome and color-graphics adapters. Unlike the IBM boards, however, it uses a true 16-bit bus, so the hardware can draw screen graphics slightly faster. Similarly, the TI monitor adapter board emulates both TI's monochrome adapter and its three-plane color-graphics adapter. The TI adapter includes four new custom integrated chips that replace an earlier graphics board.

If you have both of these adapter boards, you can run both TI and IBM software, switching between them with a simple one-line command. The machine will reboot itself when you switch modes.

TI plans to offer monochrome and color monitors that will work with either of the adapter boards. If you have both adapters in your system, a tiny cable lets you keep the monitor attached to the PC-AT adapter but transfers control to the TI board when you are in TI mode.

In the PC-AT mode, you can use either IBM's Enhanced Graphics Adapter (which displays up to 16 colors at 640 by 350 resolution) or the Professional Graphics Adapter (which displays 256 colors at 640 by 480). TI says these graphics boards work in the Business Pro, but we were unable to test them. They may require a third-party monitor and an additional speaker (the Business Pro's speaker is actually built into its monitor).

Processor and Memory

Like the PC AT, the Business Pro uses a standard 6-MHz Intel 80286 central processor and can also accept an optional Intel 80287 numeric coprocessor to speed up math operations (such as recalculating a spreadsheet).

Unlike the AT, the TI machine has a "turbo" mode, which switches off the wait states in the processor and speeds operations. With older, slower memory chips the central processors had to wait for the memory to be ready. But this waiting is not necessary with the 150-nanosecond memory chips the Business Pro uses on its main circuit board and in a special memory expansion area.

> EQUIPPED with its two optional monitor adapter boards, the Business Pro can emulate both the TI Professional and the IBM PC AT.

You can switch to the faster mode through a one-line command issued at operating system prompts—a simple task though not as useful as the switching method on some other machines. (On a Compaq DeskPro 286, for example, you can switch between 6-MHz and 8-MHz modes at any time by typing a three-key command (Control-Alt-Backslash). In our tests, the TI's faster mode did not affect the machine's compatibility. TI says that, without the wait states, the Business Pro should be competitive with the DeskPro 286, even though the Compaq uses a faster 8-MHz 80286 processor. (For a review of Compaq's DeskPro 286 and Portable 286, see page 84.)

In our speed test, the Business Pro was able to run standard benchmarks of processor and memory speed much faster than an IBM PC, faster than the IBM PC AT, and almost as fast as the top speed of the Compaq 286s. For instance, a prime number sieve took 75 seconds to run on the Business Pro in normal mode and 59 seconds in turbo mode. The same test took 74 seconds at 6 MHz and 54 seconds at 8 MHz on the Compaqs; 80 seconds on a PC AT, and 191 seconds on an IBM PC. A test of single-precision multiplication and division took 69 seconds on an IBM PC and 27 seconds on a PC AT. On both the Business Pro and the Compaq 286s, it took 22 seconds in normal mode, but the Compaqs at 8 MHz took 16.1 seconds compared to 17.6 seconds for the TI in turbo mode.

In other words, a Business Pro at full speed is faster than an IBM PC AT and slightly slower than the Compaqs. In practice, you probably won't notice any difference unless you are doing extremely complicated numerical calculations.

Expandability

The Business Pro comes with a parallel port, a serial port, a clock/calendar built onto the main circuit board, and eight full-size and six half-size expansion slots. These slots were designed to match those on the AT; as a result, they will not accept most of the expansion boards available for the TI Professional, which are about an inch too long.

The Business Pro comes with 512K bytes of memory on its main circuit board, which can be expanded to more than 15 megabytes of RAM. Two special, tiny 64K-byte boards piggyback onto the main board to raise the memory to 640K bytes, the maximum addressable by programs designed for the IBM PC. In addition, a special extended memory area can hold up to six sets of 512K-byte memory modules, letting you add up to 3 megabytes of RAM beyond the 640K bytes without using any of the 14 expansion slots. With those slots, you can add still another 12 megabytes of RAM, which can function as a RAM disk or a print buffer. New programs written for the 80286 central processor are expected to address the additional memory directly.

If you add 3 extra megabytes of memory to the special memory area, the Business Pro can address the memory without using any wait states (80286-based computers with today's standard memory chips must

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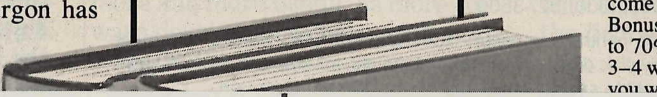

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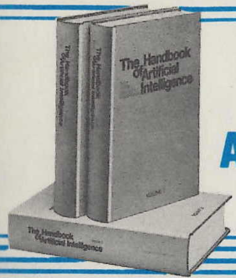
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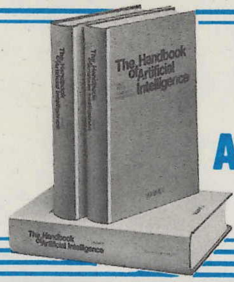
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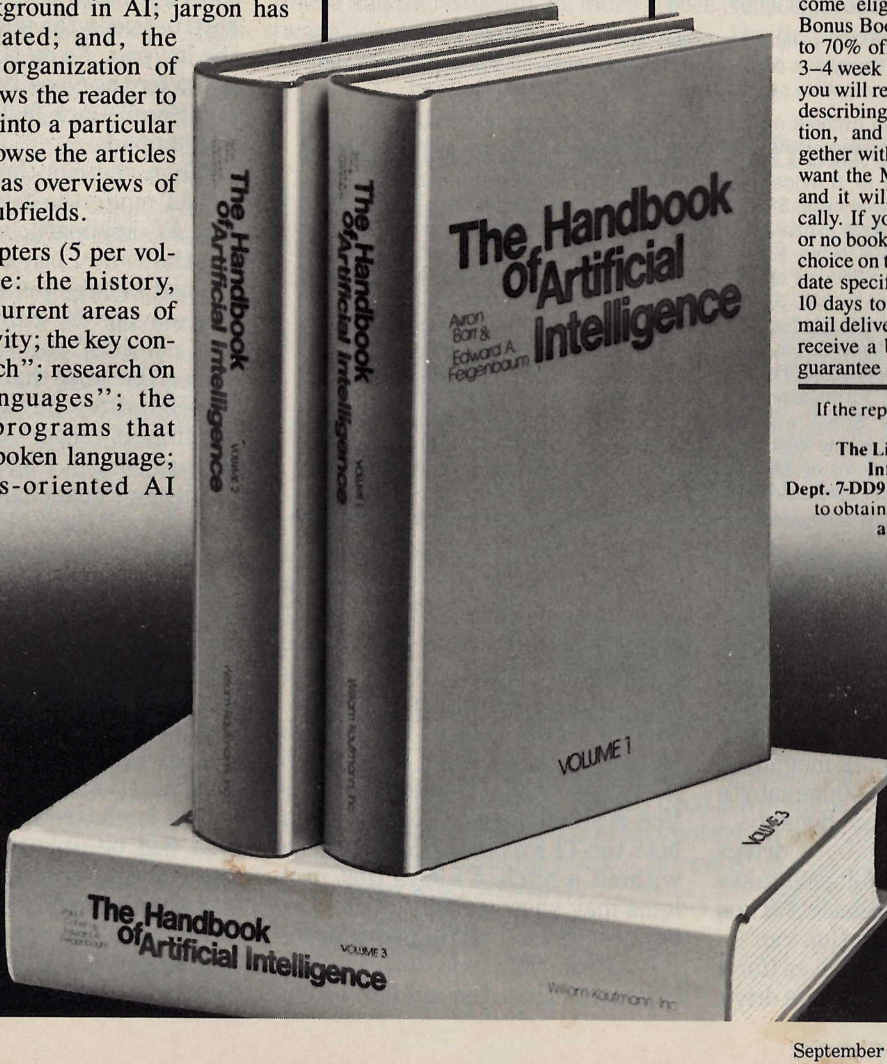
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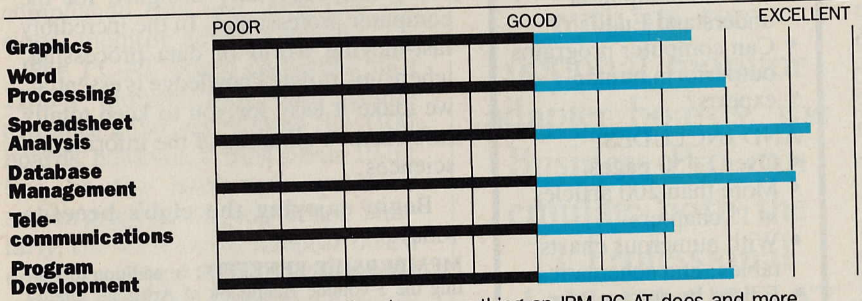
use at least one wait state to access memory through an expansion slot). Only TI memory cards will work, however; you can't bargain-hunt for third-party vendors whose products (including multifunction boards) fit the conventional expansion slots.

The Business Pro also has six locations for half-height mass storage devices, including disk and tape drives. Four slots are on top of the tower, and two are on the bottom. The bottom slots, which are completely covered when the machine is closed, are designed for fixed hard disks. Initially, TI will offer 360K-byte and 1.2-megabyte floppy-disk drives; 21-, 40-, and 72-megabyte hard-disk drives; and a 60-megabyte tape drive for hard-disk backup.

AT A GLANCE

The TI Business Pro



Reviewer's Note: The Business Pro does everything an IBM PC AT does and more.

Manufacturer:	Texas Instruments, Data Systems Group, POB 809063, Dallas, TX 75380-9063; (800) 527-3500
Standard Features:	Intel 80286 central processor; 512K bytes of RAM; 5¼-inch 1.2-megabyte floppy-disk drive; 14 option slots (eight full-size and six half-size); IBM-compatible serial port; parallel port; 100-key keyboard
Base List Price:	$3995 (without monitor or adapter); $5795 (as above but with 21-megabyte Winchester hard-disk drive)
Options:	PC-AT or TI mode CRT controller, $495; monochrome monitor with tilt/swivel base, $450; color monitor with tilt/swivel base, $795; 128K-byte RAM expansion kit for expanding main memory from 512K bytes to 640K bytes, $350; first additional 512K bytes above 640K, $1250; each additional optical mouse, $195; MS-DOS 3.1, $95; Natural Link Access to DOS 3.0, $125; MS-DOS 3.1 with Natural Link Access, $180; MS-BASIC 3.0 (for AT mode), $100; 3270 SNA Communications, $675; 931 Terminal emulation (for TI mode), $150; typical system prices (preconfigured, not including monitor): $4400 with 512K bytes of RAM, 1.2-megabyte floppy-disk drive, either TI or PC-AT mode controller; $5940 with 512K bytes of RAM, 1.2-megabyte floppy-disk drive, 21-megabyte Winchester hard-disk drive, and TI controller; $6040 with 512K bytes of RAM, 1.2-megabyte floppy-disk drive, 21-megabyte Winchester hard-disk drive, and PC-AT mode controller

The 40- and 72-megabyte drives are full-size devices, and each takes up two adjacent half-size slots. Thus the maximum configuration can include two 72-megabyte drives (for a total of 144 megabytes), a tape drive, and a single floppy-disk drive. Such farsighted expandability is good, of course, but the current version of MS-DOS (3.1) recognizes only the first 33.5 megabytes of storage on a single disk drive.

The 1.2-megabyte and 360K-byte floppy-disk drives are compatible with similar drives on the AT, although TI uses a dual-speed motor to aid the 1.2-megabyte drive in reading 360K-byte disks, such as those used on the IBM PC or TI Professional. TI says the larger-capacity drive can read data from the smaller drives, but it has a smaller head, which was not designed to write data back to the 360K-byte disks. However, in practice, reading and writing disks from both the TI Pro and IBM PC worked without a hitch. TI says that problems may show up only under very hot or very cold working conditions.

At $1995, TI's tape device is more expensive than the similar backup device offered by Compaq. However, the firm claims it is faster. Our review unit didn't include a tape drive, so we were unable to test this.

All of the mass storage devices can be used to store data and programs for use under either TI or PC-AT modes. The first hard disk is referred to as drive "C" in PC-AT mode and drive "E" in TI mode, though its physical contents do not change. Of course, application programs must be run in the mode they were designed for.

The Keyboard

One of the great strengths of the TI Professional has been its keyboard, which I still find superior to the IBM PC's. With the Business Pro, TI has tried to maintain the best features of its keyboard while adding AT compatibility. The result is a 100-key keyboard with a typewriter-style layout, 10 function keys on the left side, a numeric keypad on the right side, and a set of cursor keys between the standard keys and the keypad. As on the AT, indicator lights for the Caps Lock, Num Lock, and Scroll Lock features are above the keypad.

When you run the machine in its PC-AT mode, the keyboard emulates the AT keyboard, allowing you to use the Num Lock key to switch the keypad between entering numbers and moving the cursor. TI changed the name of its "return" key to "enter" because that's the term used by IBM. A few TI programs require a different "enter" key (next to the keypad on a TI Professional), so the Business Pro includes a "send" key underneath the right-hand shift key that emulates the old "enter." In addition, you can use the separate set of cursor keys. In TI mode, the keypad works only for entering numbers, so you must use the separate group of keys for cursor movement. For compatibility with the TI Pro, the keyboard also includes F11 and F12 function keys.

The keyboard is designed so that you will be able to move the keys around and reprogram their locations with a utility TI is expected to offer later. This would make it possible to put all 12 function keys together on the right-hand side or across the top, as on a TI Professional, or put the Escape key (now located next to the keypad, as on the PC AT) in a more reasonable location.

The Business Pro keyboard requires a slightly harder touch than does the TI Professional but slightly softer than that required by IBM's keyboard. The keyboard height can easily be adjusted.

How Compatible Is It?

The Business Pro fares very well in compatibility tests. In PC-AT mode, it uses a BIOS (basic input/output system) designed by Phoenix Software, one of the most successful suppliers of IBM-compatible input/output systems. Nearly all the IBM PC AT programs we tried worked well with our review unit, including Peachtext; WordStar Professional and WordStar 2000; PFS:File, Write, and Access; Microsoft Word and Multiplan; Word Perfect; XyWrite; Lotus's 1-2-3 and Symphony; Framework; Spotlight; Sidekick; GEM Draw and Desktop; and Bullet. There were a few minor problems: 1-2-3 had to be started twice to get past the copy protection, ThinkTank displayed brown instead of yellow, and Flight Simulator failed once in turbo mode, though it ran on subsequent trials.

The Business Pro, in effect, is functionally more of a PC AT with TI Professional compatibility added than a TI Pro with IBM compatibility. The machines have IBM-compatibility expansion slots and an IBM-compatible serial port, though TI also offers serial ports compatible with the TI Professional. Additionally, a minor change in the disk I/O system causes some problems with copy-protection systems for several TI products, such as an earlier version of Novell's Netware program.

Most TI Professional programs also ran well, including WordStar, CorrectStar, PFS:File and Report, Multiplan, SuperCalc III, 1-2-3, Easywriter, and Volkswriter.

ThinkTank, Arborist, and TI's Natural Link simply wouldn't run, probably because of copy-protection problems. Similarly, because of disk-handling differences, TI says new releases will be needed of the TI versions of Flight Simulator and Novell's Netware. Because of keyboard differences, Multimate does not recognize the PageUp and PageDown keys (which didn't exist on the TI Professional keyboard), but it does work with F11 and F12 instead. And TI's telecommunications programs won't work with the Business Pro's standard serial port.

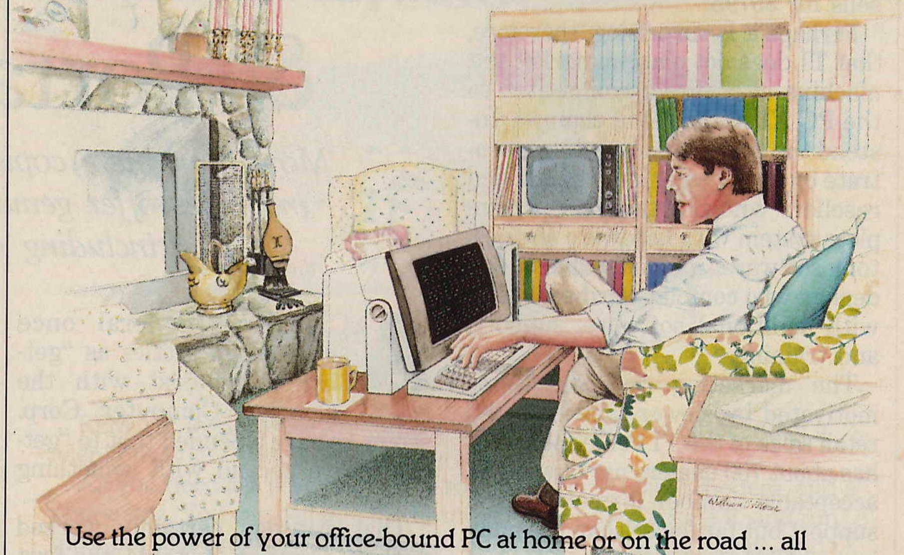
Future Choices

Most people will probably see the Business Pro as a very fast single-user microcomputer able to run software written for the IBM PC or the TI Professional. And, indeed, that's its most logical use, given the current state of the software.

However, TI hopes that new software may take advantage of the machine's special abilities. First of all, the Business Pro can also be used as a local network server with Novell's Netware software and 3 Com's Etherlink hardware. This will become more and more useful, as more software developers release application programs designed for network users. And sometime this fall, TI plans to offer Microsoft's Xenix operating system for the Business Pro, which will let you use it as a multitasking, multiuser system. The Business Pro was designed to support up to eight users under Xenix, while the IBM PC AT can support only three.

The Business Pro's greater memory capacity (15 megabytes compared with 3 megabytes on the PC AT) also will be a benefit when programs that use the 286's expanded capabilities come out. All current MS-DOS programs are limited to using 640K bytes at a time. As of this writing, we have seen no programs that use the 80286's "real mode," which can address up to 16 megabytes, thus making it easy to run multiple applications simultaneously.

TI may take advantage of the Business Pro's memory capacity with applications that grow out of the firm's advanced artificial intelli-



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gence research. These programs include the Natural Link natural-language programs, the Personal Consultant expert systems development program, the TI-Speech voice recognition and text-to-speech conversion system, and Arborist, a decision-tree program. Traditionally, AI programs have required large amounts of memory.

The Bottom Line

All in all, TI has created a machine that does everything an AT does and a lot more. If you already use a TI Professional, you'll be glad the new machine runs your current software. And if you are considering an IBM PC, AT, or one of the many other compatible computers, the Business Pro's additional option slots, larger internal mass storage and memory capacity, and ability to support more terminals make it an appealing machine.

Even with its extra features, the basic model carries a price tag about equal to a similarly configured AT. With 512K bytes of RAM and a single 1.2-megabyte floppy disk, it has a list price of $3995; the same unit with a 21-megabyte hard disk sells for $5795.

Perhaps it is surprising, therefore, that TI does not plan to market the machine as a direct competitor to the PC AT in the retail channel. Instead the firm now plans to concentrate on direct sales, on value-added resellers who put together a complete system with hardware and custom software, and on value-added dealers who combine hardware sales with additional software, support, and training.

The marketing decision seems motivated by slower-than-expected retail sales of the TI Professional. TI has about 700 dealers nationwide, an acceptable number for service and support but far fewer than the number of IBM dealers.

The Business Pro's flexibility and expandability make it superior to the AT. And if you have an eye toward future needs, it is well worth the search, even though it may be harder to find.

—MICHAEL J. MILLER

Michael J. Miller is a West Coast editor of *Popular Computing*.

THE 286 GENERATION

The Compaq DeskPro 286 & Portable 286

More than mere copies of IBM's AT, these machines offer genuine enhancements—including raw speed

A Civil War general once summed up tactics as "getting there first with the most." Compaq Computer Corp. seems to have amended that to "getting there second with something better."

That strategy certainly worked with its Compaq Portable, the first transportable computer that was compatible with the IBM PC. The popularity of the Portable caused the company to mushroom into a $329-million business in less than three years.

When IBM brought out its powerful new PC AT last fall, Compaq struck again, releasing an AT-compatible desktop unit (the DeskPro 286) and a transportable version (the Portable 286).

Compaq's machines are not just copies of the AT, however. They offer genuine enhancements, such as higher CPU speed, greater RAM capacity (in the DeskPro 286), portability (in the Portable 286), monochrome graphics at no extra cost, greater hard-disk capacity, and an optional tape backup unit.

Like the AT, the Compaq system use the 80286 microprocessor (henc the name 286), a true 16-bit CPU that's largely compatible with th 8088 used in the IBM PC. Also lik the AT, they run the latest versio

PHOTOGRAPH BY RYSZARD HOROWIT

of Microsoft's operating system, MS-DOS 3.1, and have high-density (1.2-megabyte) disk drives that can also read and write disks in the old MS-DOS 2.11 (360K-byte) format.

So You Want Speed?

Raw speed is the most notable feature of these new Compaq machines. They operate with an 8-MHz clock speed instead of the AT's 6-MHz, giving the Compaq systems roughly a 30 percent speed advantage. A 2500-cell Lotus 1-2-3 spreadsheet of 50 rows and 50 columns recalculated in just 2.3 seconds when instructed to let each cell add 10 to the value of the preceding one. And the Compaq machines ran a standard benchmark test for speed in only 54 seconds, compared to 80 seconds for the AT.

But this blinding speed can cause problems, especially with telecommunications software. For example, Crosstalk XVI, a popular communications package for the PC, counts CPU cycles to estimate the passage of time; it is supposed to wait about 30 seconds for a remote computer to answer the phone. The Compaq 286's faster CPU cycles made the software give up after just 10 seconds, before a connection could be made. (I later discovered a Crosstalk command that lengthens the countdown.)

The possibility of timing complications doubtless led Compaq to include a dual-speed option in both 286 models. By pressing three keys you can slow the CPU to 6 MHz (the system responds by beeping once) and toggle it back to 8 MHz (it beeps twice). In this slow mode, the Compaq machines' test speed of 74 seconds more closely resembled that of the AT. I found you could even change speeds while running an application program without crashing the program.

Running the system at 6 MHz should eliminate timing problems with software written for the IBM AT (but not for the even slower 4.77-MHz PC). However, to avoid compatibility problems with expansion boards designed for the AT, Compaq cleverly designed its systems so that all the memory addresses between 640K bytes and 1000K bytes (except a segment used by the system ROM) run at 6 MHz. This arrangement, in effect, makes the so-called 8-MHz mode a two-speed mode, minimizing hardware timing problems.

Dual-Mode Monitors

The Portable 286 has a 9-inch green-phosphor monitor built into its case, while the DeskPro 286 has a separate 12-inch monitor, available with either an amber or green phosphor display.

The monochrome display is noteworthy on both systems. It generates high-resolution text—crisp characters, each formed in a 9 by 14 dot matrix. The display actually is an emulation of IBM's monochrome graphics card, but the Compaq's display circuitry converts an IBM-standard character of 8 by 8 pixels to a 9 by 14 cell. You can call up this conversion from the keyboard. The 8 by 8 characters are, by comparison, crude and barely legible.

An application program, or BASIC's Screen command, can change from text mode to medium-resolution (320 by 200 pixels) or high-resolution (640 by 200 pixels) graphics. (Compaq offered this monochrome graphics arrangement on its earlier systems.) Despite all this tinkering with the graphics output, Microsoft's Flight Simulator—widely used as a standard for graphics compatibility with the PC—worked like a charm. This dual-mode feature gives the Compaq systems an immediate price/performance advantage over the AT. Though the base list price is about the same, you'd have to buy an optional graphics board and a graphics monitor to get the AT system to run graphics.

Unfortunately, the graphics board emulation means you can't get on-screen underlining, since graphics boards don't produce underlined text. Compaq had such a feature in its earlier systems, but most word-processing software recognizes that it's dealing with a graphics board and uses some other attribute (such as reverse video) to indicate under-

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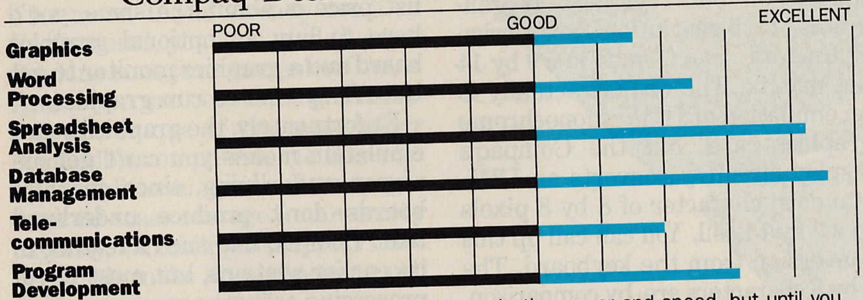
lining. Since the feature rarely got used, Compaq left it off the 286s.

Disks and Colored Lights

While the high-density disk drives on the DeskPro and Portable 286s are basically the same as those on the AT, Compaq managed to get one-up on IBM by adding special indicator lights. Most drives have a "busy light" that glows when a read or write operation is taking place, but the LED on the Compaq high-density disk drive glows red when accessing a 360K-byte disk and green when accessing a 1.2-megabyte disk.

AT A GLANCE

Compaq DeskPro 286 and Portable 286



Reviewer's Note:	The Compaq systems offer seductive power and speed, but until you can use the extra RAM, the machines won't reach their full potential.
Manufacturer:	Compaq Computer Corp., 20555 FM149, Houston, TX 77070; (713) 370-0670
Standard Features:	8-MHz 80286 microprocessor that can be toggled to 6 MHz; dual-mode text and graphics monochrome monitor; 84-key keyboard; 256K bytes of RAM (DeskPro expandable to 8.2 megabytes, Portable expandable to 1.6 megabytes); 1.2-megabyte floppy-disk drive; RS-232 serial port; parallel printer port; security lock
Dimensions:	Portable 286: 20 by 8.5 by 16 inches; weight with hard disk about 33 pounds
Base List Price:	DeskPro 286, $4244; Portable 286, $4499 (both with 256K bytes of RAM, high-density disk drive, serial port, parallel port, and monitor)
Options:	Tape drive backup unit (both systems), $899; high-density floppy-disk drive, $650; 360K-byte floppy-disk drive, $350; 512K-byte to 1048K-byte RAM expansion board, $1095; 512K-byte RAM upgrade, $695; 128K-byte RAM upgrade, $150; 20-megabyte hard-disk drive, $2095; 30-megabyte hard-disk drive, $2595; 70-megabyte hard-disk drive, $5195; MS-DOS version 3, $65

The Compaq's high-density drive had no trouble reading all the 360K-byte formatted disks that I gave it. The drive detects a disk's format automatically, and you can watch the color change as the drive tries one format and switches to another.

Compaq also managed to get one-up on the AT by offering greater capacity hard-disk drives. While IBM offers only a 20-megabyte hard-disk drive (though the AT's BIOS can support more), you can get 20-, 30-, or 70-megabyte disk drives for the DeskPro 286. (The Portable uses a 3.5-inch hard disk to allow room for shock mountings. This limits it to a 20-megabyte hard disk—currently the highest capacity available in a 3.5-inch hard-disk format.)

Tale of the Tape

Where Compaq really pulls ahead of IBM is by offering an on-board tape backup unit for either system for $899.

The tape drive unit occupies a compartment beneath the floppy-disk drive where you otherwise could put a second floppy-disk drive. The tape drive accepts a 3M DC1000 Mini Data Cartridge, which costs about $20. Unfortunately, each tape holds only about 10 million bytes—at least three tapes are needed to back up a 30-megabyte hard disk.

The operating system comes with four tape commands for backing up and restoring data on the hard disk, displaying a directory of the tape, and formatting the tape. You can back up long files with as many tapes as needed, you can back up and restore selectively, and you can automatically back up only those files that have been updated since the last backup. The directory command lists all the files on a tape, and you can interrupt or abort it just as you would with a disk-based directory command.

Unfortunately, the tape drive is noisy and slow—it sounds like an electric drill and takes about 40 minutes to format a new tape. Half of the formatting time is spent putting tracks on the tape to guide the read head, which helps ensure that a tape written on one machine can be read on another—an important feature if the data is to be transported from one machine to another.

The actual backup procedure takes about 15 minutes to fill one tape. At that rate, it would take nearly an hour to back up an entire 30-megabyte drive but you would need to back up the whole disk only once; after that you could save just the files that have been updated since the last backup. Even though Compaq's tape drive does not measure up to many systems offered by third-party suppliers (see "Hard-Disk Tape Backup Systems" on page 58), it is still more convenient than fumbling around with a stack of floppy disks.

Compaq stresses that the need for archival tapes is greater with the Portable 286 because the Portable can easily be shared by several people in a given company. The tape drive allows users to back up their hard-disk data when they are done with the machine and restore it on the hard disk when they are ready to pick up where they left off.

Slots and RAM

Compaq has promised us vast RAM—8.2 megabytes on the DeskPro 286. Actually, the 80286 CPU can address 16 megabytes of RAM, but the RAM capacity is limited physically by the number of available expansion slots.

You can expand the DeskPro 286 from 640K bytes to 2.2 megabytes by replacing the 64K-bit RAM chips on the main board with 256K-bit chips. Further memory expansion requires adding expansion boards. Of the DeskPro's five expansion slots, one is intended for the hard-disk controller board and one is reserved for boards designed for the PC's 8-bit bus. Each of the three remaining slots will accept a 1024K-byte memory expansion board ($1095).

The Portable 286 has less flexibility than its desk-bound twin. The basic system comes with 640K bytes of RAM already made up of 256K-bit chips, so you can't expand by simply upgrading the memory chips. Of its three expansion slots, one is for a hard-disk controller and one is for 8-bit boards—leaving only one slot available for a memory expansion board.

Sundry Considerations

Like the AT, both Compaq systems come with a security lock on the front. When the lock is on, the keyboard is disabled and the system won't boot. The key can be removed in either the on or off position, however, and I think I'd be tempted to turn it "on" and then throw the key away. According to Compaq, the purpose of the key lock is to match the AT's specifications in bid competitions.

The Compaq keyboard is also similar to that of the AT, although the PrtSc ("Print screen") key is separated from the Shift key so you can't accidentally trigger a screen dump and possibly crash the system by putting your hand down in the wrong place on the keyboard. Compaq has placed the usual status lights on the Num Lock, Scroll Lock, and Caps Lock keys.

Both the DeskPro 286 and the Portable 286 have a battery-powered real-time clock, so you don't have to enter the date and time every time you power up. Both units also have an open socket for an optional 80287 arithmetic coprocessor and, like the AT, a serial port that uses a 9-pin connector.

Tomorrow's Machines

These new Compaq 286 models are part of a new generation of microcomputers led by the IBM PC AT. But Compaq believes that its computers will be able to serve the next generation of software longer and better than the AT will, since they offer greater throughput speed and more RAM.

> IT'S UNDERstandable that Compaq would stress the future. Right now, its new computers are about double the price of a similarly equipped PC.

It's understandable that Compaq would stress the future. Right now, its new computers are about double the price of a similarly equipped PC. The extra speed and massive RAM capacity are nice, but for now, you'll have a hard time finding software to take advantage of it—all current MS-DOS software packages are written with the PC's 640K-byte limitation in mind.

Compaq expects Microsoft, the developer of MS-DOS, to come out with a new version of that operating system that opens up the extra RAM, and doubtless we'll soon be seeing programs that hog every bit of it. As for Xenix, the Unix-based operating system that accesses the additional RAM and turns the AT into a multiuser system, Compaq says you can get a copy from your IBM dealer. But the battle of multiuser versus networked personal computers is just beginning.

For the moment, it seems that Compaq has again gotten there second with something better.

—LAMONT WOOD

Lamont Wood is a freelance writer who lives in San Antonio, Texas.

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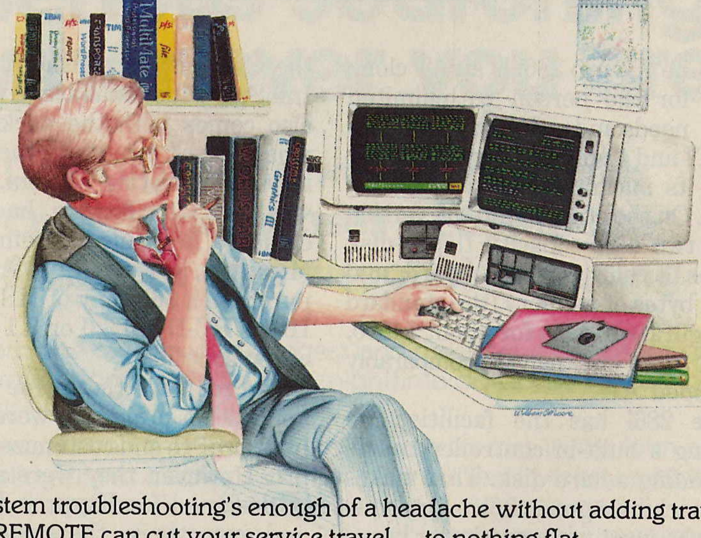

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The Kaypro 286i

A low price and bundled software make this AT compatible worth consideration

The Kaypro 286i is an AT clone for the person with limited needs and a tight budget. Unlike TI and Compaq, Kaypro doesn't offer its machine with a hard-disk drive. On the other hand, the version with two high-capacity floppy-disk drives, a color-graphics board, and 512K bytes of memory (the standard configuration) sells for about $4550, about $1000 less than the comparably equipped AT.

The 286i has the facilities, including a built-in controller board, for adding a hard disk. That makes the machine a good choice for someone who must use a particular brand of hard disk for reasons of corporate compatibility—or who just wants to save money by purchasing and installing an inexpensive disk drive.

Software and Documentation

The 286i comes with a complete set of MicroPro business software: WordStar version 3.3, MailMerge, the CalcStar spreadsheet, and the InfoStar Plus database. GWBASIC also comes with the package. But what doesn't come with the package is your operating system. As this was written, Kaypro hadn't concluded a licensing agreement with Microsoft, so for now buyers have to purchase a $65 copy of MS-DOS (or IBM's PC-DOS) 3.0 or 3.1 from another supplier.

The manuals that come with the application programs were written by MicroPro and customized by Kaypro. However, they were apparently designed for Kaypro's PC clone, and even there, the customization was not complete. I got well into the WordStar configuration program before I discovered that the supplied version was already configured. The manual did not tell me that.

The only piece of documentation expressly designed for the 286i is a 68-page spiral-bound user's guide. It is quite specific on some points, maddeningly vague on others, and just plain wrong in some places. For example, it tells you to run the diagnostic disk when the machine is set up for the first time. Good advice—only there is no diagnostic disk and, according to Kaypro, no plans for one. It also gives rudimentary instructions for running MS-DOS and never tells you that MS-DOS doesn't come with the computer.

The Kaypro 286i is highly software-compatible with the IBM PC. Even some programs I'm not sure would work on an AT ran on the 286i—notably version 2.0 of Lotus—which is good news for anyone with a lot of IBM PC software and data to be transferred to the Kaypro.

But that's not to say the 286i can run all PC software; it can't. For example, Microsoft's Flight Simulator crashes when asked to display the view out the cockpit window. A copy of Rogue displays properly, but the machine differences trip the copy protection.

Although Kaypro says the 286i will run Microsoft's Xenix version of the Unix operating system, it doesn't offer Xenix as an option. This is probably smart since a hard disk is just about mandatory for Xenix.

Outward Bound

The Kaypro 286i is a handsome machine, with the case done in a vaguely menacing black. It is big—and it hulks. Overall, it looks like Darth Vader's workstation.

The microprocessor is the 6-MHz version of the Intel 80286 chip. There is an open socket for an optional 80287 math coprocessor chip.

The system is equipped with 512K bytes of RAM and can be expanded to 640K bytes on the main circuit board. Kaypro accomplishes this by providing sockets for 128K bytes of 64K-bit RAM chips in addition to 512K bytes of the more usual 256K-byte chips. With added memory cards, the 286i can handle up to 15 megabytes of RAM. In practice, however, you can't cram more than about 10 megabytes into the computer because some of the expansion slots have other demands on them.

There are eight expansion slots on the motherboard, five of which are available for memory expansion. The

PHOTOGRAPH BY RYSZARD HOROWITZ

computer comes with a serial port, parallel port, RGB color interface, and a clock/calendar. According to Kaypro, any board designed for the AT will work in the 286i, including IBM's advanced graphics adapter. Kaypro doesn't sell expansion boards. In fact, the only option available from Kaypro is a color monitor, although the company may offer a hard disk before too long.

The Kaypro keyboard is laid out just like the AT keyboard. The AT diagnostic disk can even be used to check it. The keyboard lacks the AT's audible key clicks, however.

As on the AT, the lights for Cap Lock, Num Lock, and Scroll Lock are at the upper right of the keyboard. When the machine is started up, you're treated to a brief light show as the diagnostic program does its checking routine and flashes the LEDs in sequence.

Also as on the AT, the 286i has a key lock on the left front of the system cabinet. Just to the right of the key are two lights, one labeled "power" and the other "hard disk," even though the machine doesn't come with a hard disk. According to Kaypro, the second light is part of the design's accommodation for people who want to add a hard-disk drive. (The Kaypro disk controller is a dual-purpose unit that can handle both floppy and hard disks.) A Kaypro 190-watt power supply is hefty enough to run most of the hard-disk drives on the market as well as a chassis full of expansion boards.

Drive Errors

The Kaypro's two half-height, high-density floppy-disk drives are on the right of the cabinet. Like most AT clones, the 286i drives can read and write to standard PC disks. However, the drives are noisy and produce a lot of disk read errors. (High-density, 1.2-megabyte drives are considerably more sensitive to head alignment than the PC-standard 360K-byte drives.) Since much of my test software was recorded on PC drives, it may be that disks that are written within the tolerances of the PC are out of alignment for the 286i.

The first boot error came when I attempted to load the DOS disk supplied by Kaypro. The drives checked

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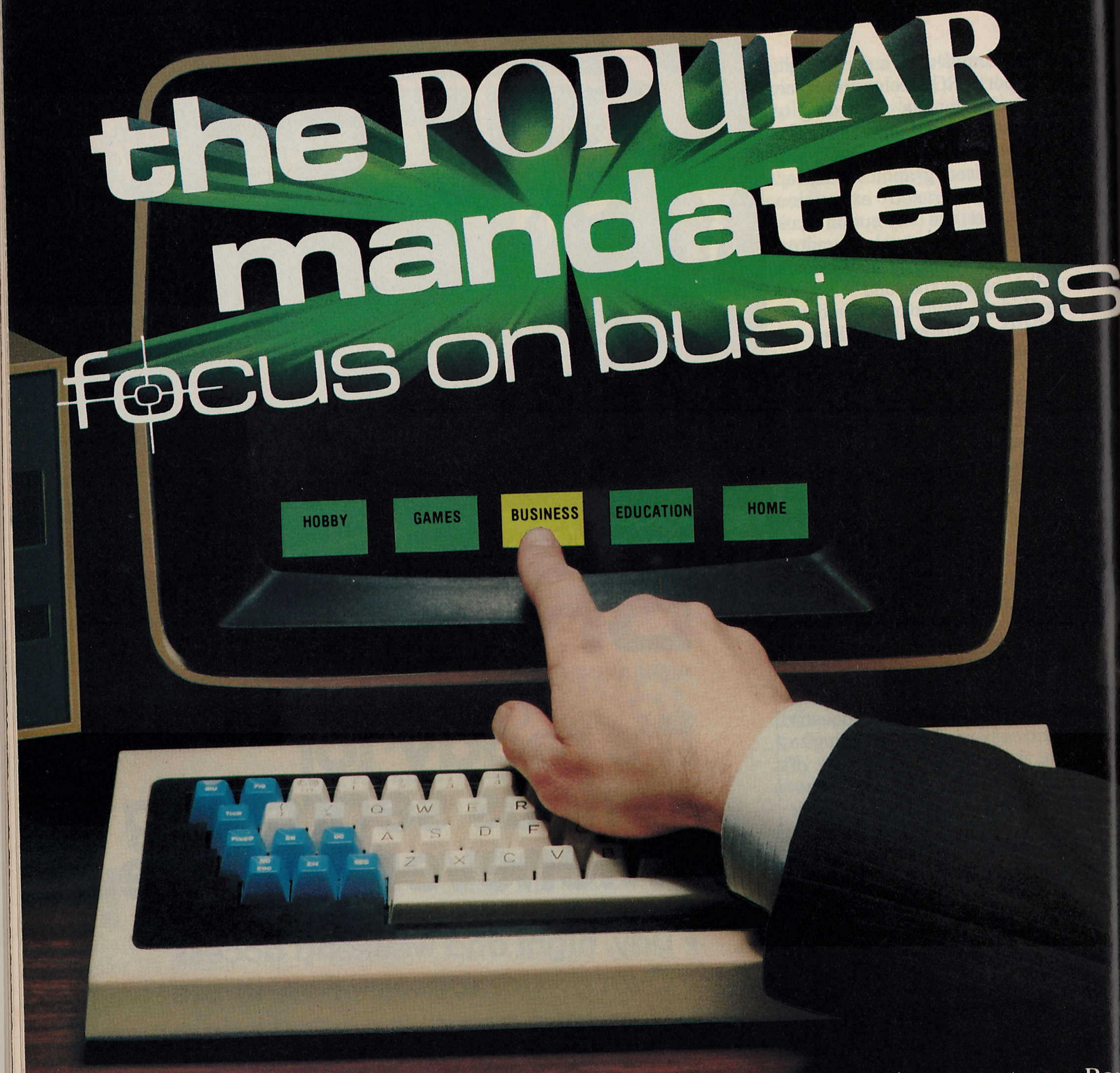

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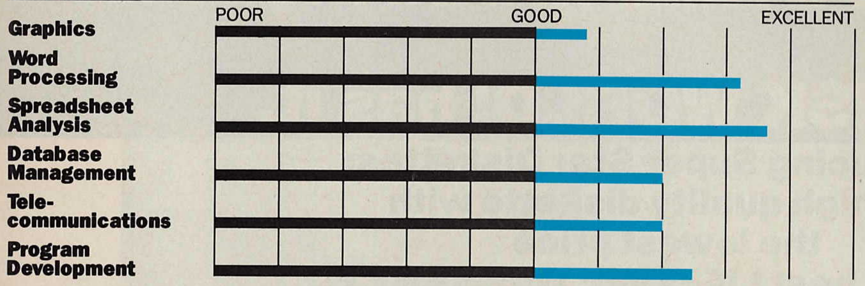
AT A GLANCE

The Kaypro 286i



Reviewer's Note: The Kaypro 286i is a highly compatible AT clone that shows signs of being rushed to market.

Manufacturer: Kaypro Corp., 533 Stevens Ave., Solana Beach, CA 92075; (619) 481-3900

Standard Features: 512K bytes of RAM; two 1.2-megabyte high-density floppy-disk drives; color-graphics adapter; parallel and serial ports; bundled with WordStar, CalcStar, InfoStar Plus, MailMerge, GWBASIC

Base List Price: $4550

Options: Color monitor, $649

out fine when I tested them with an IBM AT diagnostic disk, which indicates they were within tolerance. (The fact that I could use the AT disk to test the Kaypro also is another measure of how compatible the two machines are.) But two or three times a day, the Kaypro would fail to load something, and I would have to reboot DOS or software. Generally the machine told me to remove the disk and try again, and the second attempt was always successful. According to Kaypro, this loading problem can't be fixed without impairing AT compatibility.

I used Kaypro's color monitor (which lists for $649) for test purposes. It, too, is big and black. It is one of the deepest color monitors I have seen in some time; it runs the full depth of the system console. The monitor's color is good, and its resolution is equal to that of the standard IBM color monitor. Fine for games and some graphics, but nothing to read text from hour after hour.

Performance

Speed tests showed that the 286i is in the AT class without being a speed demon—much faster than a PC, but not as fast as some of its competitors. This may be because the processor runs at only 6 MHz. Unlike the Compaq, the 286i's processor cannot be switched to a higher operating speed. In the standard speed benchmark tests, the 286i managed a time of 73 seconds compared to the AT's 80 seconds.

Overall Impressions

The 286i is a product solidly in the Kaypro tradition. It is relatively inexpensive—functional without being fancy. However, it isn't nearly as "finished" as the Compaq 286s or the AT itself. A lot of the nice extra touches are missing and some of the omissions, such as the monochrome adapter and the operating system, are just plain puzzling.

Given the reliability problems IBM reportedly had with hard disks on its early ATs and given the retail price of hard-disk drives, Kaypro's decision not to mount one on the 286i is defensible and probably wise. Omission of a monochrome adapter and the operating system are harder to defend. On the whole, the computer seems to have been rushed to market. Certainly the documentation would have benefited from more work. Still, the 286i works well and has no serious bugs.

—Rick Cook

Rick Cook, who lives in Phoenix, Arizona, frequently writes for *Popular Computing.*

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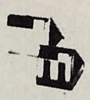

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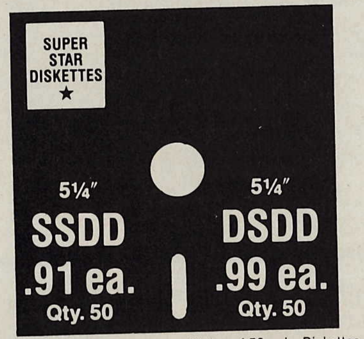

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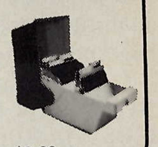

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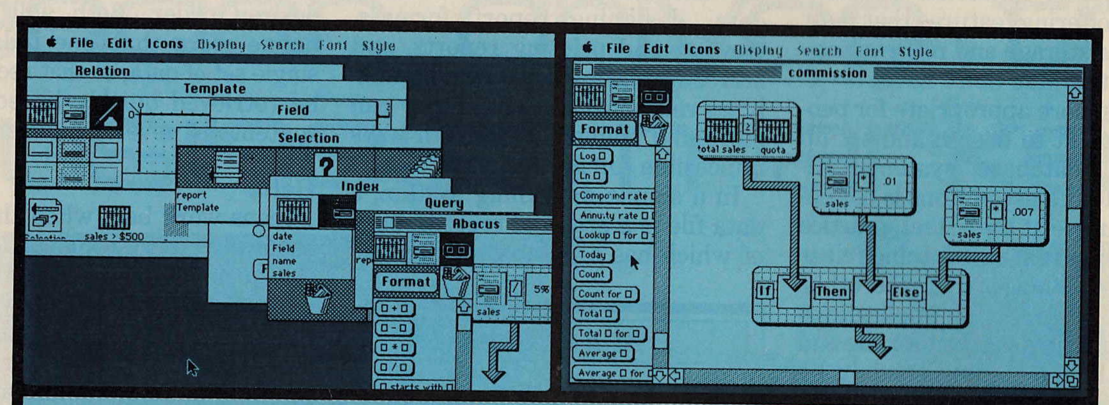
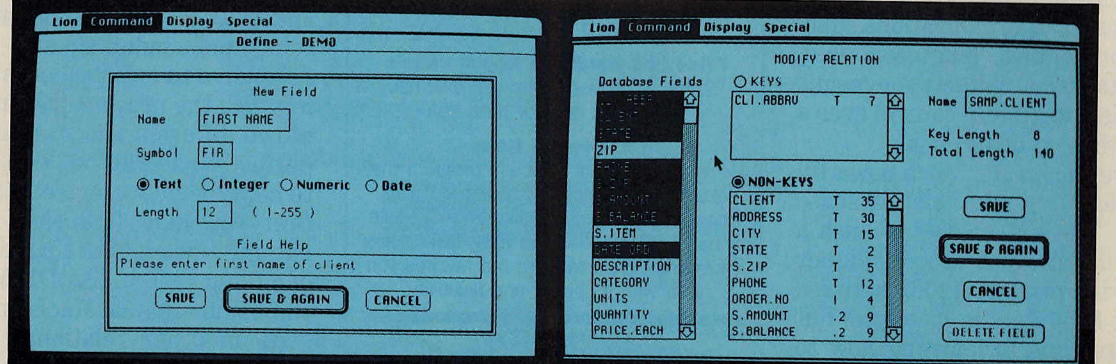


HELIX MAKES EXTENSIVE USE OF THE MAC'S ICONS THROUGHOUT ALL PHASES OF OPERATION.



Define - DEMO

New Field

Name FIRST NAME

Symbol FIR

● Text ○ Integer ○ Numeric ○ Date

Length 12 (1-255)

Field Help

Please enter first name of client

MODIFY RELATION

Database Fields

ZIP
S.ITEM
DESCRIPTION
CATEGORY
UNITS
QUANTITY
PRICE.EACH

○ KEYS

CLI.ABBRV	T	7

● NON-KEYS

CLIENT	T	35
ADDRESS	T	30
CITY	T	15
STATE	T	2
S.ZIP	T	5
PHONE	T	12
ORDER.NO	I	4
S.AMOUNT	.2	9
S.BALANCE	.2	9

Name SAMP.CLIENT

Key Length 8

Total Length 140

MACLION USES THE SPECIAL CHARACTERISTICS OF THE MAC ONLY TO A LIMITED DEGREE.

Helix and MacLion

Two radically different approaches to full-featured relational database management on the Macintosh

Helix and MacLion are two complex and powerful relational database systems with radically different approaches to the Macintosh user interface.

By "user interface" I mean the way a program communicates with the people who run it—how it presents information and how it accepts commands and data. Helix faithfully adheres to the Macintosh's standard interface, using the icons and pull-down menus extensively—perhaps even excessively—throughout the program.

MacLion, on the other hand, lacks many of the characteristics of a normal Macintosh application. Some of its deviations from the standard Macintosh user interface make it harder to learn to use than other applications, while others, such as the absence of the cut-and-paste feature, the scrapbook, and the notepad, make it harder to integrate with other Mac programs.

To put these criticisms in some perspective, MacLion, unlike Helix, runs on the 128K Mac and according to a company spokesperson, Computer Software Design made the conscious decision to sacrifice features related to the Mac's desktop (icons and pull-down menus) in favor of packing in more features, such as the applications generating language, Leo. If in the future the company reassesses its commitment to the 128K Mac, it's possible it would more completely implement the standard Macintosh user interface.

Despite the differences in the way Helix and

MacLion interact with you, they are both powerful relational database systems, offering features that most other data storage and retrieval systems on the Mac don't have.

Helix is more appropriate for people who want to design and set up relational database systems. Although Helix's use of icons is not entirely intuitive at the outset, practice with the program makes things clear by and by. MacLion, on the other hand, is more of an applications generator than a product for the end user. Although it can certainly be used by individuals to create database systems, it is a better candidate for database programmers who wish to write custom applications for sale to businesses or organizations. MacLion's procedural language, Leo, gives database architects the means to exercise maximum control over a system they're designing.

Not everyone needs such powerful and full-featured relational database systems. The extra costs of such a system include not only a higher price for the product ($400 compared to about $150 for file handlers) but also extra time in learning how to use it (about ten or so hours compared to about one or two hours).

If all you need to do is to maintain a simple mailing list, you can use a program dedicated to that task, such as MacAdvantage Mail Manager. Within an hour and a half you can enter data and print labels for a short mailing list. Accomplishing the same task as a first project is likely to take more than nine hours with Helix and even longer with MacLion, unless you purchase MacLion's sample mail merge disk, available from the publisher for $15. But even then the learning time is certainly more than an hour and a half.

Other simple filing systems that will suffice for many data storage and retrieval requirements include PFS:File and Report and DB Master for the Macintosh. But if you can afford to invest time in learning a more powerful and flexible program now, you will find yourself in a better position to deal with unexpected data comparison or reporting requirements.

Like other databases, Helix and MacLion have methods for defining the structure of data records, designing data-entry displays, entering data, designing report formats, viewing and printing reports, and searching the databases. Additionally, as relational databases they can store and manipulate data in ways impossible for file handlers.

In a simple data filing system, a data file is a group of records, each of which has a number of fields of predefined types. In a mailing list data file, for example, each entry in the mailing list has a record in the data file. One field in each record might contain the addressee's name, another his or her company's name, another the street address, while other fields hold city, state, and zip code. Each such data file is independent of any others created with the same application. For example, a data file with friends' names and birthdates might contain much of the same information found in the "name" field of the mailing list file. But because the two data files have different record structures, the two sets of data could not be used together to print mailing labels for all friends having birthdays this month.

AT A GLANCE

Helix

Manufacturer

Odesta Corp.
3186 Doolittle Dr.
Northbrook, IL 60062
(312) 498-5615

Price and Hardware Requirements

$395; 512K Macintosh with external floppy-disk drive or hard disk

Reviewer's Note

Helix is a relational database program that extends the concept of using icons to, some might say, its illogical end Capable of handling complex data filing tasks, Helix takes some time to learn but rewards you later with its power and flexibility.

In relational database systems, groups of records are held in relations rather than in data files. Even very different relations can be used together to generate special reports in a relational database system. As do ordinary filing systems, both Helix and MacLion store information in records with predefined data fields. Both programs make use of indexes, data structures that make it possible to retrieve records in a desired order. Both will let you define more than one index for a single set of data, so that records can be retrieved quickly based on the contents of several different fields.

Helix

Icons work best when they build naturally on prior knowledge about the world. For example, MacPaint's paintbrush icon reminds you of its function. The Helix icons are not as successful at exploiting world knowledge to promote rapid learning.

Helix uses many different icons—one for collections of relations, another for the relations themselves, and still others for fields, templates, selections, indexes, and queries. After five to twenty hours of working with the program, the meanings of the different icons are clear and perfectly natural, but they do little to help the new user get started. At first you may find they are less natural to work with than the menus of a filing system like DB Master or the commands of MacLion.

As in other relational database systems, Helix's relations are sets of records with the same kinds of fields. A mailing list relation will use fields for name, address, and so on, while an employee relation will have fields for name, salary, and the like. You define fields by dragging them from an "icon well" and then naming the field. You can set its data type—text, number, date, or flag—by double-clicking on the field icon to open a window of field-type choices.

Number, date, and flag fields can all have their data types further specified through the use of a format option which provides a good deal of flexibility. Numbers, for example, can be displayed with a selected number of digits after the decimal point, with or without dollar signs or commas, as percentages, or in scientific notation.

Helix imposes no limits on the number of characters per field, fields per record, records per file, or the number of files you can work with at once. The few limits it does impose are related to hardware. Using a 400K-byte external disk drive as your data disk, you can create a

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database of about 1500 to 1700 records given a record size of about 225 characters. The way you manage that space is up to you. With a hard disk, all the quantity limitations are alleviated.

Templates you design determine the format of screen displays and printouts. You must build a template for the entry screen you want to use to enter data into a relation, a template for any printed forms you plan to use, and so on. Unlike MacLion and most other Mac data filing systems, Helix lets you easily use the built-in Macintosh fonts when you build templates, controlling the fonts used both on-screen and in printed reports. File menu commands let you select custom paper forms, such as labels for printing; do page setups; print saved files, templates, and forms; and find and print all the records of a relation.

The selection icon lets you interact with data by specifying the template that controls screen format. With this icon, you can also specify an index, which allows your data to be displayed in order. Using indexes also makes searching and sorting data much faster. When you don't define an index and specify it in a selection window, selections are based on the order in which you originally entered the data records. You can use a selection window with a specified index to print records in a certain order or to print only those that meet certain criteria.

Helix's approach to search constraints or queries is awkward to learn, but convenient once mastered.

Probably the most controversial aspect of the Helix user interface is the use of "calculation tiles" to specify the values of fields or aspects of the display. Rather than use a conventional programming language syntax for controlling a database, Helix lets you compose "iconic statements." You do this by manipulating abacus icons composed of individual calculation tiles that have such meanings as "if . . . then . . . else . . . " and " . . . * . . . " Certainly any database creator who can use conventional database command syntax can learn to use this icon approach, but it is a bit startling at first, and it consumes a great deal more screen space than ordinary command-language statements do.

You can transfer data to and from other Mac programs via the clipboard, and Helix can create ASCII files to share data with programs that require that format. Odesta plans to support other data formats in future releases. (Registered owners receive free updates.)

Helix comes with a Guided Tour Disk and tape, just like the tutorials provided for Apple software for the Macintosh from Apple Computer Inc. The demonstration given in the tutorial is quite fast moving and the verbal explanations aren't very thorough, so some users may be a bit discouraged after completing the tape. You will probably have to read a good deal of the Helix manual before you can use the product effectively. Fortunately, the 235-page manual is well written and includes plenty of illustrative screen prints. A toll-free number provides registered owners with technical support.

Helix also comes with a Resource/Work Disk and a 16-page supplementary manual that describes three sample Helix applications: one for generating form letters, one for retail inventory control and consignment, and another for maintaining checkbook records with Helix. Since the guided tour disk contains a fourth application, a system for maintaining library catalog and borrowing records, you have a number of diverse examples to explore.

Helix requires a 512K Macintosh or a Macintosh XL and an external floppy-disk drive or hard disk. The program is not copy-protected.

Helix is a complex application that extends the Macintosh user interface standard in ways that give you a feeling of direct control. It is likely to gather a following of true believers.

AT A GLANCE

MacLion

Manufacturer
Computer Software Design
1904 Wright Circle
Anaheim, CA 92806
(714) 634-9012

Price and Hardware Requirements
$379; 128K or 512K Macintosh and Macintosh XL with Macworks and external floppy-disk drive or hard disk

Reviewer's Note
MacLion is a relational database program that also includes a programming language. Capable of handling complex databases, MacLion, uncharacteristically for Mac software, departs from the standard user interface. This makes the software both incompatible in some ways with other Mac software and also not quite as easy to learn.

MacLion

Although this is not the case, MacLion has the look of a program designed for a conventional computer system and then ported over to the Macintosh. The Macintosh user interface is incompletely and inconsistently implemented in this program. One of the obvious departures from the Mac standard is the absence of the leftmost menu, the Apple menu. In other Macintosh applications this menu is used to bring up desk accessories such as the calculator, clipboard, and scrapbook. (In the absence of the clipboard, data transfer between programs is accomplished via ASCII files, which the program writes and reads.)

The menu bar is unconventional in other respects, as well. It does not have the File and Edit menus commonly found in other productivity applications. Functions the Mac user expects to find in a File menu, such as New and Open, are found in the Command menu. The Print function, which is usually under the File menu in other Mac software, is tucked away under the command Printer On from a special menu.

One of the greatest commandments for Macintosh developers is to seek "modelessness" wherever possible. MacLion rejects this standard. It has seven distinct modes: Utility, Define, Query, Editor, Reports, Program, and Screens. Each mode has its own set of menus and treats similar-appearing data on the screen in different ways.

The set of standard Macintosh fonts is not available in MacLion—only a monospaced font can be used on-screen and for printed reports. This feature makes it easy to line up data fields, but it ignores the spirit of the Macintosh.

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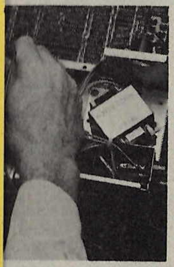

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database of about 1500 to 1700 records given a record size of about 225 characters. The way you manage that space is up to you. With a hard disk, all the quantity limitations are alleviated.

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space than ordinary command-language statements do.

You can transfer data to and from other Mac programs via the clipboard, and Helix can create ASCII files to share data with programs that require that format. Odesta plans to support other data formats in future releases. (Registered owners receive free updates.)

Helix comes with a Guided Tour Disk and tape, just like the tutorials provided for Apple software for the Macintosh from Apple Computer Inc. The demonstration given in the

AT A GLANCE

MacLion

Manufacturer
Computer Software Design
1904 Wright Circle
Anaheim, CA 92806
(714) 634-9012

Price and Hardware Requirements
$379; 128K or 512K Macintosh and Macintosh XL with Macworks and external floppy-disk drive or hard disk

Reviewer's Note
MacLion is a relational database program that also includes a programming language. Capable of handling complex databases, MacLion, uncharacteristically for Mac software, departs from the standard user interface. This makes the software both incompatible in some ways with other Mac software and also not quite as easy to learn.

rowing records, you have a number of diverse examples to explore.

Helix requires a 512K Macintosh or a Macintosh XL and an external floppy-disk drive or hard disk. The program is not copy-protected.

Helix is a complex application that extends the Macintosh user interface standard in ways that give you a feeling of direct control. It is likely to gather a following of true believers.

MacLion

Although this is not the case, MacLion has the look of a program designed for a conventional computer system and then ported over to the Macintosh. The Macintosh user interface is incompletely and inconsistently implemented in this program. One of the obvious departures from the Mac standard is the absence of the leftmost menu, the Apple menu. In other Macintosh applications this menu is used to bring up desk accessories such as the calculator, clipboard, and scrapbook. (In the absence of the clipboard, data transfer between programs is accomplished via ASCII files, which the program writes and reads.)

The menu bar is unconventional in other respects, as well. It does not have the File and Edit menus commonly found in other productivity applications. Functions the Mac user expects to find in a File menu, such

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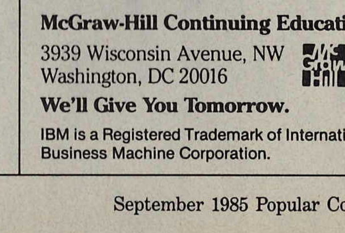

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With bulldozers and chain saws, man is constantly encroaching upon their range.

They can't share our spaces. So we have to give them the space they need.

That's the idea behind the National Wildlife Federation's Land Heritage Program. With the aid of interested individuals and corporations, we're acquiring still undeveloped land to preserve the habitat of endangered animals like the bald eagle.

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MacLion has an unusual (for the Macintosh) dependence on cryptic keyboard commands that are not reflections of menu options. To stop adding data records to a relation, for example, you have to type two slashes followed by a return. MacLion also makes unusual use of option key combinations for moving a text pointer, for deleting, and so on. Other applications on the Mac employ the command key to provide such keyboard controls, reserving the option key for modifying the nature of data being entered.

MacLion allows you to have up to 14 files open at once if you have 512K bytes of RAM, 8 with the 128K Mac. On either machine, the limits are 255 characters per field, 25 fields per record, and any number of records per file that your hardware can support. Given a standard-type mailing list, you can expect to fit between 5000 and 6000 records on one 400K-byte floppy disk.

Leo, the MacLion

Despite the many clear departures from the Macintosh standard interface, this program does not completely abandon the user to an older-style command-oriented database system, such as dBASE II. For those who appreciate that style of control over a database, however, MacLion provides a database programming language called Leo. Leo is a stack-oriented language, one that expects the programmer to store intermediate results of computations in a special data structure called the stack. As with other stack-oriented languages, such as FORTH, Leo is likely to seem cryptic at first to those who do not have experience programming in such languages.

Experienced database system programmers who wish to develop systems for vertical markets (such as shoe repair shop or church pledge database systems) may be able to use Leo to set up data-entry and reporting systems that look to end users like separate applications, especially developed for those markets. Using Leo, it may be possible to hide MacLion's standard data manipulation features from users in ways that would be impossible with Helix. (At the time of this writing, Computer Software Design planned to establish a licensing arrangement that allows programmers to use MacLion as part of an application program for between $25 and $50.)

For those who do not plan to write their own database systems using Leo, MacLion offers few advantages relative to Helix. Those who find the standard Macintosh user interface congenial are especially likely to be disappointed by MacLion.

The 252-page tutorial is clearly written, and the documentation includes a 262-page technical manual and introduction to Leo. The MacLion master disk is copy-protected and must be reinserted when copies are used.

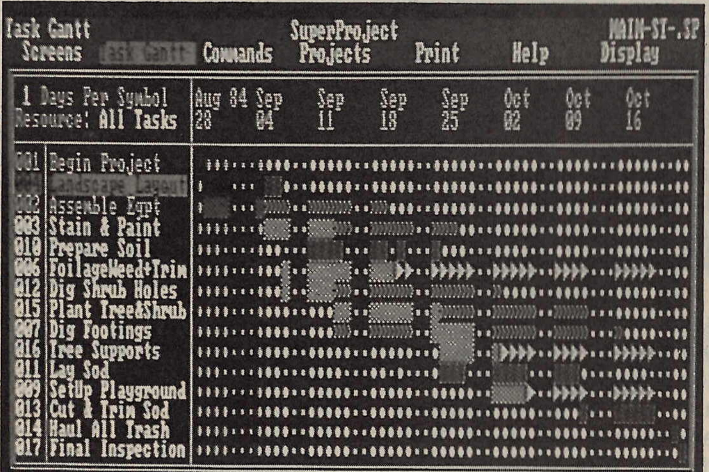
MacLion requires a 128K or 512K Macintosh with an external disk drive or a hard disk.

The Choice

Both Helix and MacLion are full-featured relational database systems, but they take radically different approaches to interacting with the user. Those who are comfortable manipulating icons in the standard Mac way are likely to prefer Helix. Those who want a special database programming language may want to look further into MacLion realizing that they won't encounter a fully implemented user interface. —ALLEN MUNRO

Allen Munro is a member of the research faculty of the University of Southern California, where he researches human/computer interface issues and intelligent computer-based instruction. He is the author of *Mac Power: Using Macintosh Software* (Scott, Foresman and Co., 1985).

BUSINESS



SuperProject

Project management software from the maker of SuperCalc

Anyone who manages people or equipment to complete a project uses some sort of project management system. It may be as simple as marking a due date on a calendar or as complex as monitoring detailed outlines of costs, resources, and multiple schedules. Those whose projects fall in the latter group may get by better with a little help from their micros.

Available not too long ago on only mainframes and minicomputers, project management software for micros is the new wave on the tide of business programs. And Sorcim/IUS's SuperProject is one of the biggest waves in the sea.

Like most of Sorcim/IUS's programs, such as its best-selling integrated spreadsheet SuperCalc 3, SuperProject is very complete and fairly easy to operate. Designed to be able to handle complex projects, SuperProject can be used by any business where the completion of projects depends on the timely completion of individual tasks.

Heart and Soul

SuperProject uses three standard techniques for managing projects: PERT charts, the Critical Path Method, and Gantt Charts.

PERT, or Program Evaluation and Review Technique, shows relationships between tasks and time periods. The Critical Path Method (CPM) shows how a delay in the completion of one task will affect the entire project. Gantt charts show tasks on a bar chart depicting the duration of all tasks in a project. This time line presents an easy-to-follow diagram of the timing of each of the tasks, showing you whether a task is on the critical path or if there is slack time (or "Float," as it is called in SuperProject) between tasks.

SuperProject is a complex program and as such demands some effort on your part before you become proficient in using it. But the program is logically designed and generally easy to work with.

Detailed Help Screens are always available and can be useful if you've forgotten where to find certain information or how to make updates.

SuperProject's pull-down menus are gateways to submenus; experienced users will appreciate the shortcuts that let you circumvent some of the menus. Equally important, the manual is well organized and clearly written. It includes a tutorial, a glossary of project management terms, and a reference section with a suggested reading list.

Using SuperProject

SuperProject's screens pull the whole show together. These include the Preferences, Project Details, Project Calendar, Resource Calendar, and Resource Details screens.

All of the screens within SuperProject are interactive—changes made to one will show up on the others. Through the screens, you tell SuperProject about project and task durations, and you provide details about and define relationships between the tasks and resources.

Through the Preferences screen you specify default items such as date formats, resource allocation, billable daily hours, fixed costs, and printer codes.

The Project Details screen collects a variety of data. It is where you enter the default work week; the project author, name, and leader; and perhaps the start date (which you can also enter from the PERT chart). From this screen, SuperProject calculates fixed, variable, and total costs for the life of the project. It also displays the number of tasks in a project, how many times you have revised the project, the number of resources used, and the duration of the project.

AT A GLANCE

SuperProject

Manufacturer
Sorcim/IUS
2195 Fortune Dr.
San Jose, CA 95131
(408) 942-1727

Price and Hardware Requirements
$395; IBM PC, XT, AT or compatibles, requires 256K bytes of RAM and two double-sided double-density floppy-disk drives or one floppy drive with hard disk, DOS 2.0 or later, and an 80-character-per-line printer

Reviewer's Note
SuperProject is for anyone in charge of managing complex projects that include PERT and Gantt charts and Critical Path calculations, project costing, and detailed task and resource information. Interactive program segments keep the entire project plan current.

The Project Calendar screen displays in traditional calendar format the nonworking days for the life of the project. Using the Resource Calendar screen, you create a calendar for each of the resources, entering their planned vacations or scheduled equipment maintenance periods.

The Resource Details screen accepts data such as billable hours in a day, hourly rate, fixed costs, resource priority, and default weekends. The variable, fixed, and total costs for the resource are also calculated on this screen.

Defining Tasks

To create a task, you select that option from the PERT menu. A task box appears on-screen, and you enter the name of the task. SuperProject automatically assigns a number to each task, according to the order entered. You are then prompted to enter the primary resource assigned to the task, along with the estimated time to complete the task. For the first task, you enter the starting date if you did not enter one on the Project Details screen.

Project size (the number of tasks and resources) is limited by RAM. With 256K bytes of RAM, you can create a project of no more than 200 tasks. With 512K, you can go to about 1600 tasks per project, and with 640K, you can have about 2000 tasks per project. Although a hard disk will speed things up a bit, it won't increase the size of projects you can develop because the entire project must fully reside in RAM.

When you finish entering the information for one task (you can edit any of the entries you made), you simply pull down the PERT menu and create another task. Once you enter all the tasks, you define their relationships via the PERT pull-down menu and SuperProject arranges the boxes on-screen accordingly. You can move the boxes around using the cursor keys.

For each task that you create, SuperProject automatically creates a Task Details screen. Viewing this screen will give you details about the tasks, such as estimated costs, early and late start and finish dates, places to enter the actual start and finish dates, and a place to enter must start and must finish dates. As you are entering the task durations, SuperProject is calculating the project duration and critical path tasks. Also available on this screen are the Task Status (scheduled, in progress, completed, or start delayed), Float time, Resource information, and predecessor and successor task information.

If there is a conflict with the resources, such as one resource assigned to two tasks that need to be completed at the same time, the program will calculate the delays and highlight the conflicts. This will allow you to change the starting dates, resource allocations, or task priorities to suit your planned schedule.

Screen displays also change to indicate tasks that have been completed. Task boxes appear at bright intensity when they are uncompleted and normal intensity when they have been completed. (Although SuperProject is based on graphic displays, you can run the program with a monochrome monitor.)

Gantt Chart

Once your PERT Chart is complete, you will want to take a look at the Task Gantt Chart, which is a time line that displays each task on one line. The calendar is displayed across the top of the screen, and each symbol on the time line represents one day spent on a task (you can alter this to display by week or month).

Float, Free Float (the number of days a task can be delayed without affecting any other tasks), and Milestones also appear in the Gantt chart. You can access the sort feature via the Task Gantt pull-down menu.

For resource scheduling purposes, you will want to take a look at the Resource Gantt screen. The program creates one such screen, showing a time line calendar for all of the tasks to which the resource is assigned, for each primary resource you have used in a task.

As the project progresses you will want to go back to your file and update the tasks, entering actual start and finish dates, updated cost information, and resource delays. The program automatically recalculates the project schedule so that you can keep track of your progress.

Additional Features

SuperProject also automatically calculates cost information for the total project on the Project Details screen, for each task on the Task Details screen, and for each resource on the Resource Details screen.

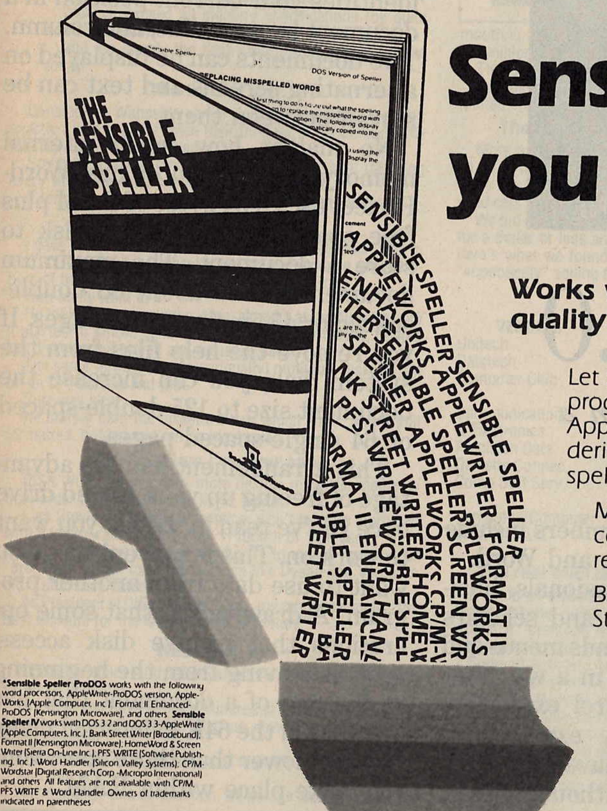
SuperProject lets you define subprojects, which are projects contained within one task, and any delays in subprojects will be reflected in the main project file.

You can also assign primary and secondary resources to a task. The primary resource is the one that appears in the PERT Chart from whose schedule the start and finish dates are calculated. Secondary resources are assigned to tasks in the Task Details screen. Delays related to secondary resources are not reflected in the overall schedule.

SuperProject's data files are fully compatible with those of SuperCalc 3 and other software that stores data in ASCII, DIF, or CSV (comma-separated value) format.

Printing is straightforward using pull-down menus. Using parameters you defined when you first set up SuperProject, the program prints at your command, while you continue working, if you wish.

Version 1.1, which should be available by the time you read this, will



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Inquiry 45

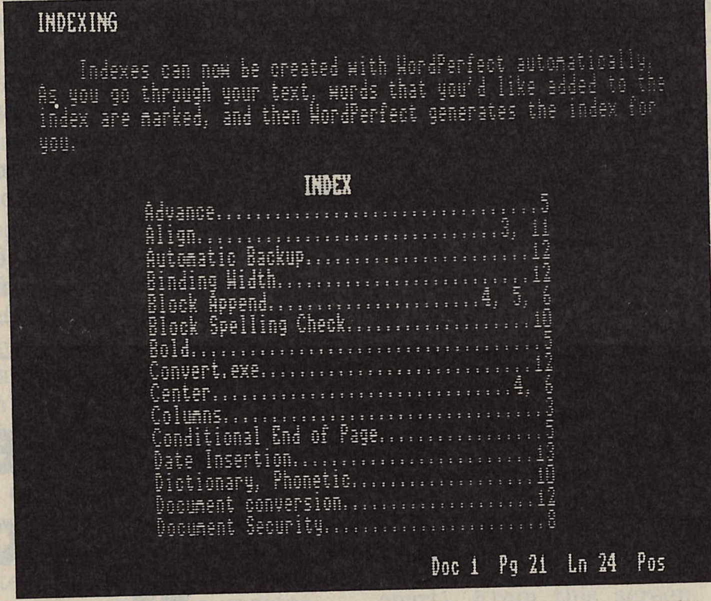
allow you to print information in columnar format (such as with spreadsheet information) directly from within SuperProject (or any other spreadsheet with compatible files), which eliminates the need to transfer information to a spreadsheet and work from within there. Version 1.1 will also come with a copy of the Sideways program (from Funk Software), which allows you to print wide reports sideways.

SuperProject is one of the most complete and easy-to-use project management packages on the market today. Newcomers and veterans will be able to use the program productively, although its capabilities will be more fully appreciated by those with previous experience using this planning approach. Those whose project management tasks go beyond penciling in dates on a calendar may want to look at Sorcim/IUS's new product.

—PATRICIA JOHNSON SWERSEY

Patricia Johnson Swersey is a writer and business consultant based in New Haven, Connecticut.

WORD PROCESSING



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     Indexes can now be created with WordPerfect automatically.
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                           INDEX
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            Align............................3, 11
            Automatic Backup........................12
            Binding Width...........................12
            Block Append.....................4, 5, 6
            Block Spelling Check....................10
            Bold.....................................5
            Convert.exe.............................12
            Center...............................4, 6
            Columns..................................3
            Conditional End of Page..................5
            Date Insertion..........................13
            Dictionary, Phonetic....................10
            Document conversion.....................12
            Document Security........................8

                                   Doc 1  Pg 21  Ln 24  Pos
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WordPerfect 4.0

This IBM PC package holds its own in a sea of tough competitors

WordPerfect has been on industry-wide best-seller lists for well over a year now, and recent enhancements are likely to secure that enviable position for a good time to come.

WordPerfect version 4.0 for the IBM PC and compatibles is a robust word processor with enough speed to make the execution of most functions smooth and efficient and enough well-designed features to make it a strong competitor in its class, whose other members include MultiMate, WordStar, and Word.

Designed for professionals, business people, writers, and scholars alike, WordPerfect blends menus and keyboard commands in a way that makes program control extremely self-evident. Indeed, experienced computer users will have little trouble getting going without lessons. Newcomers will appreciate the clear, logical instructions.

Among the new features with which SSI Software has endowed WordPerfect version 4.0 are block highlighting, custom cursor definition in which you can choose a cursor shape that most appeals to you, paragraph numbering, indexing, endnotes, a table of contents generator, automatic backup, date-insertion option, and outlining. Old features upon which SSI has improved are the menus, documentation, spelling checker, footnote function, and file-conversion utility.

The revised documentation shows the same thoughtful crafting as is evidenced in the program, a rare combination. Twelve lessons lead to mastery of logically organized groups of features. Every feature in the program is listed alphabetically in the Reference Guide with step-by-step instructions. In practice, I was able to bypass the manual almost completely by relying on the 14-page Quick Reference booklet, the new function-key template, and a terrific on-screen help system.

WordPerfect has one of the cleanest editing screens around. A lone status line in the lower right corner identifies your current position in a document by page, line, and column. Two documents can be displayed on alternating screens and text can be moved between them.

No matter how much internal memory your computer has, WordPerfect uses 64K bytes of RAM plus free space on the system disk to store a document. The maximum document size is about 88 double-spaced or 45 single-spaced pages. If you remove the help files from the system disk, you can increase the document size to 125 double-spaced or 64 single-spaced pages.

This arrangement has the advantage of freeing up your second drive once you've read in the file you want to work on. This is convenient if you want to use data from another program. A drawback is that some operations that involve disk access, such as moving from the beginning to the end of a document that has overflowed the 64K in internal memory, are slower than those operations that take place within RAM.

Cursor-movement commands are painlessly executed from the number/cursor keypad. Finding your way

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Introducing Wabash Pinnacle Series Diskettes.

Two years ago, if you'd told me I'd be writing this ad, I would have laughed.

At that time, Wabash diskettes were synonymous with "s—t".

Just saying that quality control was poor would be charitable.

So much was wrong that DISK WORLD wouldn't sell them.

That was yesterday.

Kearney-National Inc., a $202-million division of a much larger company, came into Wabash.

Out went the old management, the old methods, the old production techniques...and in went a lot of new people, ideas, production lines and some really imaginative thinking.

The end result.

Today, I'm proud to offer you the Wabash Pinnacle Series of diskettes at the prices shown.

This isn't evolution in diskette manufacturing: it's revolution.

Here's what you get.

Wabash Pinnacle diskettes are
...certified 100% Error Free
...are coverd by a LIFETIME WARRANTY
...meet or exceed all industry specifications (by quite some distance)
...and are simply the best value in diskettes available today.

The torture test.

Considering Wabash's earlier dubious reputation, I wasn't exactly a true believer when their Director of Marketing came into my office with samples.

So I took a box at random, selected a disk, bent the thing every which way and slipped it into my IBM-PC.

It formatted. It booted. It stored and retrieved data.

That wasn't enough.

I gave samples of the diskettes to Curt Rostenbach and, in turn, to Tom Streit, both hackers of long experience and members of the Waukegan (Illinois) Apple Users Group.

Tom really went at it.

He took a quartz-halogen lamp, aimed it at the diskette until it started to smoke (and melt)...and then formatted, booted the diskette and stored and retrieved data!

The same terribly (and intentionally) mutilated diskette ran on an ITT, Corona and IBM.

Curt was nicer.

He simply bent the diskette every which way...and it still formatted, booted and ran on his Apple.

The best buy I've ever seen.

DISK WORLD!, Inc. sells more flexible magnetic media by mail-order than anyone else in the world.

I, as President of the corporation, won't tolerate a product with a failure rate of more than 1/1000th of 1 percent.

I also don't like companies who try to milk a "quality" or "premium" image for a higher price like Dysan and Verbatim did...until they failed.

As President of DISK WORLD!, Inc., my motto is simple: "the best diskette for the least amount of money."

Wabash is it.

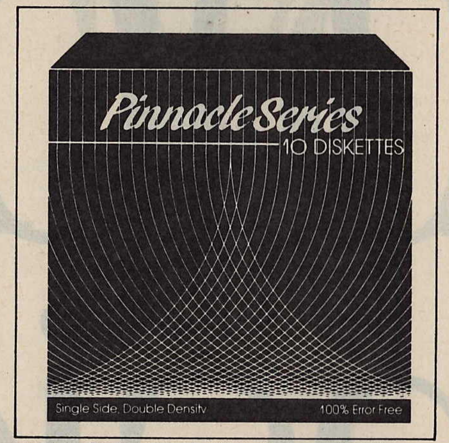
Right now, there is no better value than the Wabash Pinnacle Series of diskettes.

Granted, you have to buy a hundred at a time, but so what? Split the order with friends, relatives, co-workers or even your worst enemies.

The key thing is to get the most diskette for the money.

And this is it.

(Incidentally, as a corporation, we put our money where our mouth is. Our first order for Wabash Pinnacle Diskettes was 1.5-million units.)



That's an awful lot of faith and confidence.

But, then again, I have the diskette that Tom Streit literally melted...and kept on running.

The truth about $1.00 or less diskettes.

More and more ads are popping up offering diskettes for $1.00 or less.

By the same token, more and more people who were selling used cars a few months ago are now selling diskettes by mail.

We did a little survey of current ads for diskettes advertised for a dollar or less and did some analysis of the market and here's what we found as it applies to 5.25″ DSDD diskettes "supposedly" selling for a dollar or less.

VENDOR:	ADVERTISED LOW PRICE:	ACTUAL PRICE PER 100:	ACTUAL MFGR.:
Unitech	.89 ea.	.92 ea.	Unspecified.
Datatech	.99 ea.	.99 ea.	Unspecified.
Computer Club	.95 ea.	.98 ea.	Unspecified.
	.99 ea.	1.02 ea.	Unspecified.
Communications & Electronics	.49 ea.	.80 ea.	Unspecified.
Precision Data	.89 ea.	.93 ea.	Unspecified.
Diskette Connec.	.93 ea.	.93 ea.	Unspecified.
Comp Soft Serv.	.77 ea.	.77 ea. + shpg.	Unspecified.
Computer/Computer	.99 ea.	.99 ea.	Unspecified.
DISK WORLD	.89 ea.	.92 ea.	Wabash Datatech

The real truth about $1.00 or less diskettes.

It costs all diskette manufacturers about the same to produce a diskette. Some may charge more because they want to project a "premium quality" image, ala the late, lamented Dysan who bought their basic media from 3M.

Some charge less because they sell a sub-standard product...and we're not foolish enough to name names here.

But here's the truth about the $1.00 or less diskette market.

It falls into four categories:

1. The DISK WORLD's of the universe who simply are so big that they can buy first quality product in massive quantities and choose to pass on the savings to you. (Precision Data and Diskette Connection on **BRAND NAME** products also fall into this category.)

2. The people who buy "cosmos"...stuff from major manufacturers that usually hits quality control standards, but is cosmetically blemished and thus can't be packaged and sold under the manufacturer's own name.

3. "Duplicator Quality". Uncertified media, usually below manufacturer's own standards and frequently below ANSI and IBM standards. Sold on an "as-is" basis with the understanding that the manufacturer's name will never be divulged. Usually about a 20% reject rate...as compared to DISK WORLD's standard of less than 1/1000th of 1% reject/return rate. Next to garbage, this is the source of most diskettes advertised at a dollar or less.

They may work...and then again they may not. (Frankly, the odds at the Blackjack table in Las Vegas are more in your favor.)

4. Garbage. Stuff that shouldn't be sold at all. But some manufacturers are hurting for cash, so they sell it anyway. (After all, they want to meet their payroll. Look what happens when you don't: you become a Dysan or Verbatim. Lots of history, but no money.) More and more garbage is being dumped into the market as manufacturers become pressed for cash and are motivated into selling anything and everything they can manufacture. (Read the article in FORBES about Verbatim and its "Bonus" brand.)

Finally, the Taiwanese counterfeiters are moving into the act. Perfect duplicates of the packaging of major manufacturers with one exception: the quality isn't there.

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Inquiry 1

around a disk full of files is just as easy. Press F5 and enter the name of the directory you want to peruse. WordPerfect displays an alphabetical listing of the files. To retrieve, delete, rename, or print one of them, move the cursor to its name and select the desired action from a menu.

WordPerfect's approach to the four basic editing maneuvers—inserting, deleting, moving, and replacing—is logical and efficient but not entirely perfect. WordPerfect is in insert mode by default. So to enter new text in the middle of a line, just type. It's in this function, however, that you'll meet one of the program's quirks. When you're inserting new text, existing words move to the right—right off the screen, in fact. But as you move the cursor down the screen, your paragraph is readjusted automatically.

Rather than instant reformatting, you get a delayed version. It's not as handy as fully automatic reformatting, where all your words remain constantly in view, but it does get the job done. As a compensation, cursor movement and the action of the delete key are quick, and WordPerfect does a good job of keeping track of line numbers and page breaks.

WordPerfect allows most of the desirable deleting options; a few attractive, though uncommon, ones are missing. Words at or to the right of the cursor can be erased easily, but you must erase backward character by character. Similarly, you can delete from the cursor to the end of a line, but you cannot erase the whole line without returning to the left margin. The sleek new block highlighting system allows you to erase from the current cursor position to the end of the sentence or paragraph with a few keystrokes.

WordPerfect's wonderfully simple macro-maker streamlines editing operations. A macro is a frequently used series of commands or block of text that a program memorizes and executes or inserts at the press of a key or two. To create a macro for deleting a sentence, I first pressed Ctrl-F10 to turn on the macro-maker. Then I named my macro "Alt-S" by pressing those keys. Simply by going through the procedure for cutting a sentence and then pressing Ctrl-F10 again to finish the macro, I endowed my copy of WordPerfect with the ability to delete a sentence anytime I press Alt-S. The only hitch is that macros are stored on disk and therefore do not execute as fast as built-in features.

The search-and-replace features are fast and flexible without any modification, allowing automatic replacement of every occurrence of a word, phrase, or formatting and printing code in a document or block of text. Searches proceed forward and backward, while replace works only in a forward direction. Lowercase search strings will match both lower- and uppercase text, and replacements will automatically match the existing case. You can also create a macro that will search for and replace any WordPerfect code, such as a carriage return, justification on/off, or a required hyphen.

AT A GLANCE

WordPerfect 4.0

Manufacturer
SSI Software
288 West Center St.
Orem, UT 84057
(800) 321-4566

Price and Hardware Requirements
$495; IBM PC and compatibles, 192K bytes of user memory required

Reviewer's Note
This is an easy-to-use, well-polished, and full-featured professional and business-oriented processor that gets better with each release and has already sold over 100,000 copies.

WordPerfect gets an A in printing and formatting. What you see onscreen is what will print, so there is little chance of an unwelcome surprise at print time. Underlined, boldfaced, or centered text is displayed without any embedded codes.

Changes in margins, line spacing, and page length also take effect immediately, and the accurate onscreen page breaks change with them. The page breaks also reflect headers and footers, which are easily created through a series of menus.

Footnotes (which can now be 16,000 characters long compared with less than half that in the previous version) and endnotes (which are new in version 4.0) are allowed within the same document, and WordPerfect automatically numbers them. You can tailor those notes through simple menu selections, including spacing within and between notes, style of numbering, and whether a line will separate footnotes and text.

WordPerfect offers a sophisticated text-column feature that allows the printing of up to five side-by-side columns of text and a binding-width option that automatically adjusts the right and left margins on printouts that are going to be bound.

And There's More

The improved Spelling Checker contains a 100,000-word dictionary with medical and legal terms, counts the words in a document, inserts corrections automatically, and offers a phonetic look-up feature.

In addition to the new endnotes and the expanded-length 16,000-character footnotes, SSI has included indexes, tables of contents, numbered paragraphs, and outlines in this edition of WordPerfect.

WordPerfect's outlining feature doesn't provide a way for collapsing and expanding outlines, but it does automatically number up to seven outline levels. You use the indent and tab keys to move to the level you want. The correct number appears and you then type in your text.

This feature has three predefined numbering styles, but you can create your own style using several available options for numbers and punctuation. Even after you've filled in an outline, it's easy to change the numbering style throughout.

In addition to automatically numbering paragraphs or outline sections, WordPerfect allows you to create a table of contents, lists of figures or illustrations, and an index. For tables of contents and lists you highlight text from your document and then enter the appropriate level number or list number, up to five in both cases. By contrast, you can enter any text into an index even if it does not appear in the associated document. The index includes headings and subheadings, and after highlighting the text you want to index, you can press the Enter key to use it for the heading or type the heading and then press Enter.

The existing security feature of password-protected files has been joined by a safety option that allows you to have new work saved automatically at any time intervals you designate.

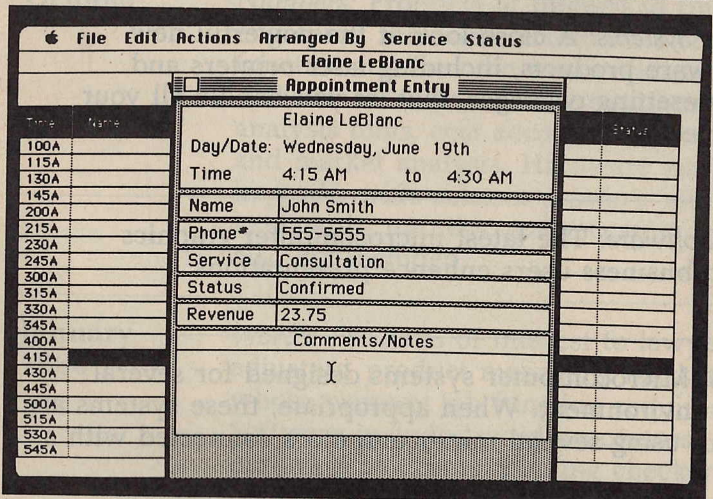
Two other new features are the redline and strikeout functions. The redline option lets you mark possible text-insertion points with a vertical line in the left column on the printed copy. The strikeout option puts diagonal lines through text to be deleted.

A menu-driven utility for file conversion now supplements the existing WordPerfect-to-ASCII and ASCII-to-WordPerfect export/import feature. It allows exchange of files with DIF, WordStar, DCA Revisable-Form-Text (an IBM file-conversion format), or 7-bit transfer formats. A date-insertion key rounds out the smorgasbord of new features.

WordPerfect is a highly functional and elegant word processor for IBM and compatible personal computers. It's easy to learn and use and can definitely hold its own against challengers in any professional or business setting. —CHARLES SPEZZANO

Charles Spezzano writes about topics in psychology and personal computing. He is the author of *Using Enable* (Que Publishing, 1985).

BUSINESS



Elaine LeBlanc

Day/Date: Wednesday, June 19th

Time 4:15 AM to 4:30 AM

Name John Smith

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Service Consultation

Status Confirmed

Revenue 23.75

Front Desk

A dynamic calendar forms the heart of this scheduling program for the Mac

Scheduling is a fact of business life. No matter what the goods and services, an efficient way to handle schedules will make any manager's job more of a pleasure than a burden.

Front Desk, from Layered Inc., can help you keep track of who is doing what and when. The only program of its kind for the Macintosh, this $150 package can handle schedules for 15 resources—people, places, or things—per appointment file and any number of appointment files you care to create. And Front Desk's revenue and time analysis features make it easy enough for you to see where all the big dollars are coming from and, conversely, identify unprofitable areas of operation.

Front Desk is easy to customize to specific applications. One possible use, as the manual suggests and its on-screen demo illustrates, is in monitoring the activities of attorneys and clerks in a law office. Other possible uses include managing a doctor's office or juggling sales calls and consulting assignments.

Front Desk is most useful when your ongoing scheduling job is complex. If it's easy to keep on file in your head how any particular resource is engaged at any time during the work day or week, you're probably fine without this program. But if you think you can get more profit out of your available resources or if you forget appointments because you're trying to remember too many at once, you should consider going electronic for time and resource management.

Front Desk is adaptable to a wide selection of businesses. The expandable and contractable calendar that forms the heart of the program is an accommodating receptacle for all kinds of information. Front Desk makes a good scheduling companion. You make the decisions, the program keeps track of them.

Subscribing to the standard Mac interface, Front Desk is a cinch for seasoned Macintosh users. Following that unwritten Mac guideline, click and you shall see, Front Desk's calendar components and grid segments deliver you to a succession of different time frames. You can move from viewing the calendar for a month to viewing all appointments for one person for one day to examining details about a single appointment. The manual, which covers nearly all eventualities and offers some handy tips about establishing an appointment file, assumes you know how to use your computer.

Your schedule is designed around a monthly calendar, for which Front Desk takes the date and time from the Mac's Control Panel. And no need to worry about the program becoming outdated: it contains calendars up to the year 2022.

Before you can start entering appointments, you must customize the program for your business. Front Desk collects all the information it needs via screens similar to the print setup screens familiar to all Mac users. Click the mouse, enter a few facts, select a couple options, and you're finished.

The calendar setup, the first of the three customization steps, involves

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November	*In-House Publishing Systems:* A close look at the powerful new hardware and software products, including laser printers and microcomputer typesetting packages, that let you handle all your business printing needs.
December	*Business Graphics Software:* The latest microcomputer graphics packages that help business users enhance presentations.
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February 1986	*Investment Software:* Financial analysis programs that give investors easy access to stock market information and investment options while built-in databases track transactions.

EDITORIAL CALENDAR
February 1986

Special Quarterly Editorial Sections:

As part of the sharper business refocus of POPULAR COMPUTING, we'll add quarterly eight-page sections to the magazine, beginning with the October 1985 issue. These sections will serve as resource and reference guides for products, both old and new, that apply to the reader's primary use of the microcomputer. The editorial content will consist of descriptions of at least 100 outstanding products, including hardware, software, peripherals, books, and online services. These sections will be in addition to the regular monthly pages.

October	*Numbers:* Products of interest to financial analysts, accountants, engineers, scientists, economists or anyone else whose primary job function requires the manipulation of numbers. Software includes spreadsheets, spreadsheet templates, accounting packages, numerical analysis tools, cost accounting, forecasting, statistics, tax preparation, and market analysis. Hardware and peripherals include numeric keypads, wide-column printers, memory cards, hard disk storage, keyboards, numeric co-processors, and data recording devices. Books also are included.
January 1986	*Words:* Products of interest to lawyers, doctors, writers, insurance adjusters, product managers, marketing managers or anyone else whose primary job function requires the manipulation of words. Software includes word processors, word processing templates, outlining programs, spelling checkers, print formatters, mailing programs, and keyboard enhancers. Hardware and peripherals include printers, keyboards, monitors, mice, multifunction cards, and hard disk storage. Books are also included.

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indicating the months your schedule will span and the days of the week, hours of the day, and appointment times you work with.

You then indicate the type of resource you'll be scheduling. For instance, following the examples outlined above, the resources in a law office would be lawyers and clerks, in a doctor's office they would be doctors and assistants, at a health club they'd be racquetball or tennis courts and perhaps instructors, and in an advertising group they'd be sales representatives. In short, resources are anything that you use to make money.

The monthly calendar and the daily appointment schedule contain reminders or descriptions about the status of a day or an appointment. The program comes with 11 status items incorporated into a menu. The appointment status items are confirmed, call, canceled, rescheduled, and missed; the day status items are out of office, unavailable, holiday, vacation, sick, and closed. While you're setting up your calendar, you can add two of your own to that list.

As the last step in the calendar setup, you indicate whether you want to retain one, two, or three months' worth of historical calendars. While you can save past months on archival disks, the historical calendars are among the 12 calendars you can call to screen at any time.

The second set of parameters you define are those for the resources you listed as you were setting up the calendar. For each resource, you indicate a two-character identification, which is unique to each resource and fixed once you enter it, and an hourly rate, which is the hourly fee each person charges or the fee charged for the use of a place or thing. That figure is used to calculate revenues or costs, which appear in reports.

Each resource has its own calendar. And the name of each resource becomes incorporated in a menu for easy selection.

Services setup represents the final group of parameters you must indicate. Services are the activities you perform using your resources. They might be, using the law office example, closings, wills, divorces, and copyright litigation. You can indicate whether each service is billed as a flat rate, on an hourly basis, or not billed at all. These figures are used in conjunction with the hourly rate you defined for each resource to produce reports. To make changes in any of the parameters, you reopen the setup window and redefine whatever variable you want.

Once you have all the parameters established, you're ready to enter appointments. To begin, you summon forth the Appointment Entry form by double clicking on an appointment slot, say 9:30 a.m. on a particular day. Along with spaces for name, phone number, service, status (the last two of which you enter by making a menu selection), and revenue (which is entered automatically when you enter the service), the form provides space for storing com-

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ments that do not appear on the schedule but are easy to access and serve well as memory joggers—"This client is a Red Sox fan."

Front Desk gives you four different ways to view the schedules in your appointment file. The Monthly Calendar view, which is your gateway to the other views, nearly fills the entire screen with a traditional calendar.

A weekly calendar is the second view, and it lets you look at the week's appointments for all resources at once or individual resources. The day calendar, the third view, shows you all the appointments for any day, again for all or individual resources. The day calendar for all resources shows only resource name and appointment. The day calendar for individual resources is divided into six columns: one indicates appointment time, another contains the name of the resource—person, place, or thing—engaged at any specific time, another has telephone numbers, a fourth displays the service that is performed, a fifth reveals the fee exacted for that service, and the last indicates the status of the appointment.

The fourth view lets you look at the same day of the week for a number of weeks. You can see all Fridays, for example, to set recurring appointments or to search for a mutually agreeable appointment time for resource and client. From within each view, except the monthly view, you can set, examine, cancel, and reschedule appointments using cut and paste to move information about an appointment from its old time slot to its new one.

Moving Around

Mouse-activated scrolling and paging functions and selective clicking move you through the various calendar levels. To see more than the 20 appointments in the day view or the five days in the week view that will fit on-screen at once, you simply use the scroll bars to move either horizontally or vertically.

Front Desk's search function will locate all the appointments booked for the entire month for a certain resource based on the name you entered for the appointment. Searching is a matter of selecting Appointment Search from the Actions menu and filling in what you want to search for. The program locates all appointments and displays them one at a time at your command.

Reports

Front Desk comes with two predefined reports—the Appointment Confirmation report and a two-part Appointment Analysis report—that can be printed for a day, week, or month. You can't create your own report format.

The Appointment Confirmation report includes all appointments for a day, week, or month. This is handy for company-wide distribution or just to have nearby while you're making confirmation phone calls. The only problem is that although the report includes any comments about an appointment that you may have entered, your message is broken arbitrarily at 50 characters.

The Revenue Report, which is the first part of the Appointment Analysis report, contains information organized by service and resource for any month you want to examine. It shows the total revenue each service generated, the percent of total revenue that each service represents, the total number of hours spent on that service, and the average revenue per hour that each service generated. For each resource, the report shows the total revenue produced, the percent of total revenue that resource contributed, the total number of hours that resource worked or was used, and the average revenue per hour that resource earned.

The Work Hours Report is likewise broken down by service and resource. By service, this report shows the total number of hours spent on that activity and the percent of the total that represents. By resource, it indicates the total number of hours that resource worked or was used and the percent of the total that represents.

You specify print conditions just as you would if you were printing a MacWrite document. And you can print reports sideways to make it more convenient to read reports that would otherwise fall on two pages.

At the time of this writing, Layered Inc. was selling version 2.0 of the program. By the time you read this, it will be selling a newer version that a company spokesperson says will allow you to copy and paste data files to the clipboard so that you can share data with other programs, such as Multiplan or Jazz. The new version will also let you send reports to the screen as well as to the printer; take advantage of the LaserWriter and Apple Computer's Switcher program, which lets you partition the RAM in a 512K Mac so you can run several programs at once; and open and close files from within the program instead of going through the desktop.

Front Desk, according to a company spokesperson, is the first in a line of planned business software. Currently under development is a billing and accounts receivable system that will work with Front Desk. Further down the road, the company plans to publish vertical front-end systems for its accounting programs.

Front Desk is a good scheduling tool for small- to medium-size businesses or divisions within larger companies. If you find that the details of running your business defy mental juggling, Front Desk may be able to create some order. It can help you manage your resources more efficiently and optimize scheduling to meet whatever goals you set.

—Beverly Cronin

Beverly Cronin is *Popular Computing*'s technical editor for software.

AT A GLANCE

Front Desk

Manufacturer

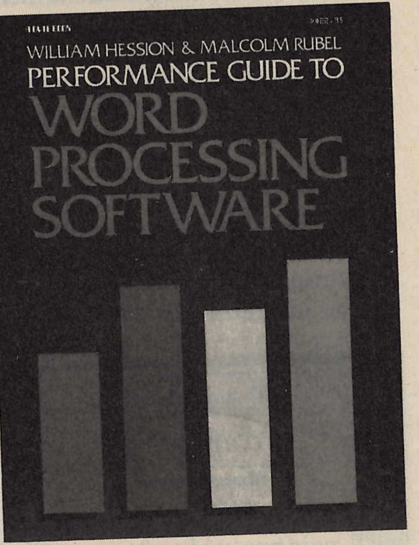
Layered Inc.
85 Merrimac St.
Boston, MA 02114
(617) 423-9041

Price and Hardware Requirements

$149.95; 128K Macintosh with single disk drive

Reviewer's Note

Front Desk, a scheduling program with time and revenue analysis reports, can help managers monitor fairly complex schedules and quickly identify the associated cash flow.



Finding the Right Tool

Performance Guide to Word Processing Software

by William Hession and Malcolm Rubel
McGraw-Hill, New York, 1985
205 pages, paper $22.95

What's the best word processor? You can champion your favorite all you want, but, in truth, no single "best" word processor exists—it all depends on your application, as Hession and Rubel are quick to point out in their *Performance Guide to Word Processing Software*. If you write novels, global editing tools may be most important. But if you create lots of tables for reports, formatting capabilities are top priority.

So how do most of us choose? Not very carefully, according to Hession and Rubel—and an uninformed decision can be expensive in terms of lost time and productivity. The authors, principals of a consulting, marketing, and research firm in New York City, found that four information sources are behind most purchasing decisions: friends, software dealers, product reviews, and books—and these sources are seldom comprehensive. The *Performance Guide* provides the missing depth—from techniques to help you quantify your own personal and business needs to a detailed analysis and comparison of 27 word-processing packages.

The *Performance Guide* is a serious volume on word-processing software that's packed with specific information on everything from planning through purchase and implementation. The authors continually emphasize the importance of taking a hard look at your current and future needs, your documents, and the people producing them. Once you've done this, you're ready for the real heart of the book. Chapter 7, "Program Benchmarks," and Chapter 8, "Program Profiles," tell you virtually all you need to know about over two dozen popular word-processing programs. The authors maintain their objectivity by running the same benchmark tests on each package, using an IBM PC with 128K bytes of memory.

Specific programs are compared in 13 handy tables supplemented with explanatory text. The first table gives price, memory requirements, and each company's update policy, and others compare functions for text entry, cursor movement, deletion, block operations, search and replace, page formatting, printing, and documentation. The last table covers utility functions such as mail merge, boilerplate assembly, and automatic file backup.

This tabular information is expanded in the profiles chapter. For each program tested, you'll find a sample screen display and a detailed evaluation that includes general impressions as well as remarks focused on editing, formatting, and printing capabilities. Naturally, some subjectivity creeps in here, but the authors support most of their negative comments with concrete examples.

Hession and Rubel have given us a good book. Along with their thorough review of specific word-processing programs, they have included helpful chapters on implementation, human and environmental factors, and ancillary word-processing tools such as outline generators, spelling checkers, keyboard enhancers, and RAM disks. The book also has a sample word-processing survey you can adapt to help you evaluate your own office needs.

Be forewarned, though; everything Hession and Rubel say isn't gospel. The chapter on printers, for example, claims that the poor quality of thermal printers renders them unsuitable for serious word processing, but several letter-quality thermal printers are now on the market. Similarly, updated versions of the evaluated word-processing programs may well answer some of the book's criticisms.

But minor inconsistencies are inevitable in any computer volume that dares to cover specific hardware and software. Whether you're buying for the first time or looking for an upgrade, the $22.95 *Performance Guide to Word Processing Software* is inexpensive insurance on a serious investment.

—ROBERT D. SWEARENGIN

Robert D. Swearengin is a contributing editor of *Popular Computing*.

MICRO REVIEWS

The dBASE III Handbook

George Chou

Que, Indianapolis, IN, 1985, 325 pages, paper $17.95

In the tradition of other Que publications, *The dBASE III Handbook* aims to be both a novice-level introduction to Ashton-Tate's database management system and an enduring work of reference for those already familiar with dBASE III. And like Que's best-selling *Using 1-2-3*, it succeeds. The book's format, organized around individual dBASE commands, makes it suitable as a reference, and concise but thorough explanations explore the nuances of dBASE III syntax. But this effective organization also provides new dBASE III users with a solid, step-by-step introduction as it guides them from general database concepts through interactively creating and maintaining data files to programming with dBASE III command files. Even though it lacks the gentle, tutorial style of introductory works and the specifically advanced focus of programmers' guides, Chou's *The dBASE III Handbook* nevertheless fills a void in the existing literature on dBASE III.

PC-DOS Customized

David D. Busch

Brady, Bowie, MD, 1985, 165 pages, paper $16.95

An operating system, as a widely known saying goes, often serves only to separate the user from a productive application. Grappling with this problem has led Busch to write the first specialized study of PC-DOS batch programming. The author first introduces batch-file programming conceptually, although the treatment is confined to a few eccentric features of DOS (like the PROMPT command) and such topics as parameters and conditional statements. But recognizing that batch files are often most valuable to those with neither the desire nor the skill to write their own programs, Busch provides a handy collection of ready-to-run batch files that enhance and customize DOS. The sample programs that display file directories in specialized ways, redefine keyboard codes, or prevent the user from formatting a disk in the default drive are all useful stand-alone routines. Others, such as the program to display a custom menu, could have been made more user-friendly had the author supplied the brief assembly-language code needed to read a character from the keyboard and call the menu option. Even though Busch has not written the definitive introduction to PC-DOS batch-file programming, he has taken a solid step toward helping inexperienced users create a customized, streamlined version of DOS.

Online: A Guide to America's Leading Information Services

Steve Lambert

Microsoft Press, Bellevue, WA, 1985, 326 pages, paper $19.95

Microsoft has packaged this tour of on-line database services with a "special, extra added attraction"—free connect time and/or waived subscription fees worth $350 (although many of the coupons earn "usage credits" valid only after paying the normal subscription fee). But freebies aside, Lambert presents communications concepts clearly and even helps the novice place a few practice calls to Tymnet and Telenet before walking through increasingly complex exercises with MCI Mail, the Official Airline Guide, CompuServe, NewsNet, Western Union, Dialog, and Dow Jones News/Retrieval. The only weak link is that the author selects specific services on the basis of the type of information they provide rather than their relative popularity—while CompuServe, for instance, is treated in detail, The Source is not. All told, Lambert's book furthers Microsoft Press's reputation for high editorial quality, eye-catching design, and fresh approaches.

The Human Factor: Designing Computer Systems for People

Richard Rubinstein and Harry Hersh

Digital Press, Burlington, MA, 1984, 250 pages, paper $25

Every programmer or system designer who has ever dared utter the "user-friendly" cliché, let alone profess to practice it, must read *The Human Factor*. The authors touch on every aspect of friendly program design—from menu-driven systems and on-line help facilities to unambiguous icon design, natural-language front ends, voice recognition, and more understandable user's guides. While examples are numerous, the backbone of the book is the development of a single automatic teller machine application that incorporates all design suggestions. The chapter on presentation and representation of computer applications—hardware and software as perceived by the user—is by itself worth the price of the book; combining design sense with psychology, the authors show which visual, aural, and tactile clues work. Programmers at every level who are determined to master their craft should begin by apprenticing with Rubinstein and Hersh.

The Gold Collar Worker

Robert E. Kelley

Addison-Wesley, Reading, MA, 1985, 190 pages, cloth $16.30

Whether programmers or physicians, editors or engineers, the talented, well-paid individuals Kelley refers to as "gold-collar" workers all possess the state-of-the-art expertise and knowledge that are the most sought-after commodities in the Information Age. But with this new breed of worker comes an entirely new set of management problems. Kelley's book addresses these problems by offering a set of ground rules for cultivating this new corporate resource—a resource that, though not tangible, may prove vital in the long-term struggle for company survival. But the author's suggestions—"intrapreneuring," creative compensation packages, progressive management practices, and the like—have already received considerable notoriety. Kelley's chief contribution lies in his fair treatment of both sides of the management/gold-collar issue and in his conclusion that enlightened self-interest and enlightened corporate interest may frequently be the same.

—MIKE NICITA & RON PETRUSHA

Mike Nicita and Ron Petrusha are coauthors of *The Reader's Guide to Microcomputer Books*, 2nd ed. (Golden-Lee, 1984).

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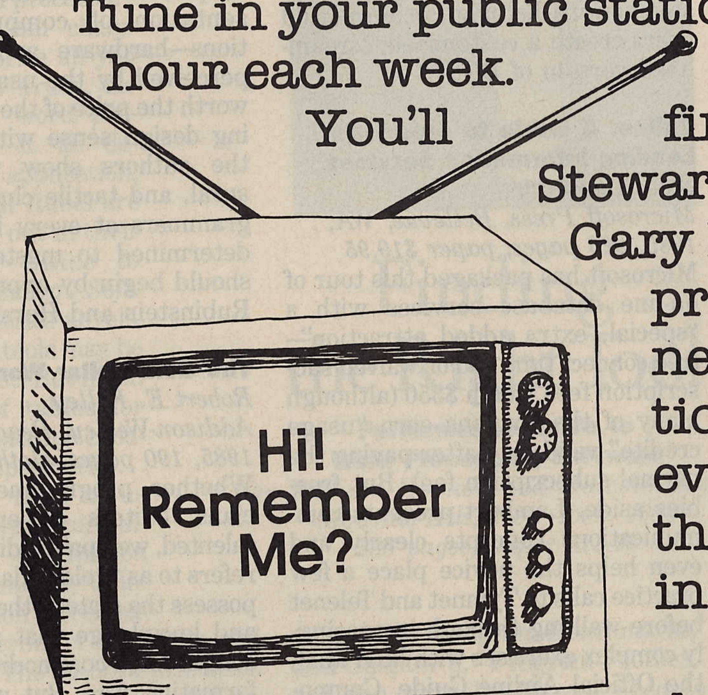

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McGraw Hill

ASK POPULAR

An easy IBM RAM upgrade, software swaps, and more

MY OLDER IBM PC CONTAINS 16K-byte RAM chips. Can I upgrade to 64K chips and increase memory without expansion cards?

—ED WILHITE
CHAMPAIGN, IL

YES. ADD-MEM (22151 REDWOOD RD., Castro Valley, CA 94546, (415) 886-5443) offers a kit that allows your motherboard to handle a maximum of 256K bytes of RAM. A printed circuit board mounts above the memory sockets on the PC motherboard. The kit sells for $75.95, and an assembled and tested version is $99.95. You must also buy the RAM chips: Add-Mem sells a 64K chip for $17.55, but you can shop for them among many suppliers.

You'll have to solder some jumper wires on the PC, or if you prefer, you can send your motherboard to Add-Mem. The company supplies a special shipping carton and instructions for removing the board and will return it within 48 hours of receipt. The $335 modification includes 256K bytes of RAM and a three-month warranty.

I'M INTERESTED IN THE NEW 65C02 upgrade to replace the 6502 microprocessor chip in my Apple IIe. Can this make the IIe compatible with Macintosh business software?

—JOHN MCGILL
FT. LAUDERDALE, FL

NO. THE 65C02 MICROPROCESSOR chip is an improved version of the venerable 6502. It uses CMOS (complementary metal-oxide semiconductor) technology to reduce power consumption and increase noise immunity. It also can carry out some additional instructions and features design improvements for more versatile programming. However, this 8-bit microprocessor won't run software designed for another machine. The 16-bit 68000 microprocessor chip in the Macintosh has a different instruction set and internal organization and is not compatible with the 65C02.

IS THERE ANY WAY TO RUN APPLE II software on my Kaypro 4-84?

—EDWARD STEWART
BERKELEY, CA

FOR THE MOST PART, NO. SOFTWARE for the Apple II family is not compatible with your Kaypro. The two computers contain different microprocessors: the 6502 in the Apple II and the Z80 in the Kaypro 4. One chip can't understand instructions for the other. The disk operating systems, AppleDOS for the Apple II and CP/M for the Kaypro, are a further incompatibility. Neither machine can read the other's disks. Finally, Apple programs often include graphics, and the Kaypro is basically text-oriented.

You can, however, change some software with two approaches. Some Apple II programs are written in CP/M; you can convert these for the Kaypro with a serial cable or a modem and a file transfer program. This is fairly easy because CP/M standardizes its memory-mapping. Also, if you have the Apple BASIC source code for a nongraphics program, you might be able to retype it in the Microsoft BASIC that comes with the Kaypro. This can be relatively straightforward for short, simple programs or very complicated and tedious for sophisticated ones.

WITH MY IBM PC, I OFTEN RUN OUT of storage space on 360K-byte floppy disks. I've seen ads for 10-megabyte hard disks, double-sided quad-density floppy-disk drives, and double-sided double-density floppy-disk drives with 96 tracks per inch. All would increase my storage capacity, but I'm not sure which to choose. Can you help?

—OSCAR LEBLANC
ST. THOMAS, VI

SURE. THE PROLIFERATION OF hard-disk drives has lowered prices to under $700 for some units. They give "more bytes per buck" and can be configured to boot on start-up. You can mount them internally in place of a floppy-disk drive or externally in a separate cabinet. Hard disks are compatible with PC-DOS 2.0 or higher and operate like any other disk drive. Because a hard disk has so much capacity, you'll be tempted to store everything on it. Just be sure that you back up all of your important data to prevent loss in case of an improper command or a head crash.

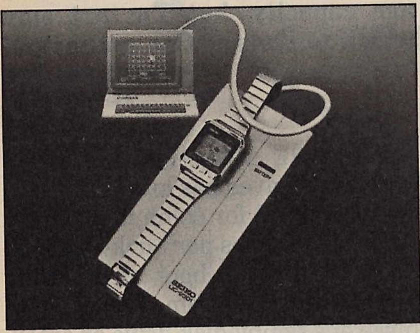
High-density floppy disks will add from 800K bytes to more than 1 megabyte of storage per drive. However, PC-DOS doesn't come configured for a high-density floppy, so you'll need a "device driver" to tell the disk operating system about your new drive. If you are adventurous, you can write your own, but if you prefer a complete system and want PC AT compatibility with 1.2-megabyte drives, contact Tall Tree Systems (1032 Elwell Court #12, Palo Alto, CA 94303, (415) 964-1980). It offers AT-compatible drives for the IBM PC starting at $449. If you use 1.2-megabyte drives, you'll also need the new high-density floppies; ordinary disks are not reliable on the new drives.

Ask Popular is a monthly column conducted by contributing editors Harv Weiner and Steve Ciarcia to answer general questions about small computers. Send your questions to: Ask Popular, POB 397, Hancock, NH 03449.

NEW PRODUCTS

A computer watch, mega-RAM expansion cards, and other noteworthy items

Hardware



Data on your wrist: The Seiko Datagraph 2001 with 2K-byte RAM stores notes, miscellaneous data, and a year of daily schedules. Software and an interface for the Apple II family are included; $199. Similar models interface with IBM, Tandy, and Commodore computers. *Consumer Electronics Division, Hattori Corporation of America, 1330 West Walnut Parkway, Compton, CA 90220; (800) 453-6413.* [INQUIRY 200]

More PC/AT memory: With Above Board/PC and Above Board/AT, you can expand your memory up to 4 megabytes beyond the normal 640K-byte PC-DOS barrier—with additional memory handled as normal workspace. Includes print buffer and RAMdisk. The boards increase spreadsheet and database size as much as 10 to 15 times. Accompanying software supervises expanded memory and supports multiple applications. Prices begin at $395 for the 64K-byte Above Board/PC and $595 for the 128K-byte Above Board/AT. *Intel Corp., TOC-03, 5200 NE Elam Young Parkway, Hillsboro, OR 97124; (503) 629-7354.* [INQUIRY 201]

Inexpensive IBM compatible: The Model D PC comes with a full complement of standard features: 256K bytes of RAM expandable to 640K, four IBM-compatible I/O slots, two 5¼-inch, double-sided, double-density drives, parallel and serial printer ports, Hercules graphics emulation, a battery-backed clock-calendar, monochrome or RGB output, and a 12-inch green or amber monitor; $1495. Other models available with hard disk and color monitor. *Leading Edge Products, 225 Turnpike St., Canton, MA 02021; (800) 343-6833.* [INQUIRY 202]

IBM 4700 PC: This new model of the PC XT is for banks and other financial institutions. In addition to the 62-key typewriter layout, the 4700 has three sets of user-programmable function keys. Priced at $3989 for a typical configuration with color monitor. *International Business Machines Corp., Information Systems Group, 900 King St., Rye Brook, NY 10573; (914) 934-4488.* [INQUIRY 203]

RAM disk for the Mac: Fully compatible with all Macintosh hardware and software, the DASCH (Disk Acceleration/Storage Control Hardware) stores data in a RAM array. You can access files instantly with no waiting for disk search. The compact unit shares the printer port with the Imagewriter. DASCH 5 with 500K bytes of RAM, $495. Also available with 1000 and 2000K bytes. *Western Automation Laboratories Inc., 1700 North 55th St., Boulder, CO 80302; (800) 227-4637.* [INQUIRY 204]

Connecting the IIc: The SC809 Smart Cable links the 5-pin DIN connector on the Apple IIc to peripherals with standard 25-pin connectors. You set one switch and the cable matches the signals automatically; $49.95. *IQ Technologies Inc., 11811 NE First St., Bellevue, WA 98005; (206) 451-0232.* [INQUIRY 205]

Tandy 1000 expansion: The TanPak multifunction board offers direct memory access, a serial port, and a clock, in 128K-, 256K-, and 512K-byte versions. With 128K bytes, $399. *Hard Drive Specialist, 16208 Hickory Knoll, Houston, TX 77059; (800) 231-6671.* [INQUIRY 206]

Data spooler: The Advanced Business System, a buffer-interface with up to 256K bytes of RAM, is suitable for local networks and telecommunication. It stores, prints, and plots data at the speed of peripherals while freeing the processor for other work. A digital readout displays memory in use or number of remaining copies to process. The spooler is "system independent," with interfacing options for all port configurations; $600. *Consolink Corp., 1275 Sherman Drive, Longmont, CO 80501; (800) 525-6705.* [INQUIRY 207]

Ink-jet printer: The Epson SQ-2000 quietly prints letter-quality text at 106 cps and produces draft-quality at 176 cps. Eight print sizes and 45 standard font styles are available. Prints graphics at densities up to 240 dots per inch. Optional interfaces, tractor feed, and cut-sheet feeder; $2295. *Epson America, 2780 Lomita Blvd., Torrance, CA 90505; (800) 421-5426.* [INQUIRY 208]

Two-headed printer: Crisp letters with a daisy wheel and graphics with a nine-pin dot matrix are features of the Fortis DH45. It prints at 36 cps with the daisy wheel and 140 cps in dot matrix draft mode, and includes boldface, underlining, proportional spacing, superscript, and subscript. The standard model comes with a parallel interface, 16.5-inch carriage, and 3K-byte buffer; other options available; $1300. *Dynax Inc., 6070 Rickenbacker Rd., Commerce, CA 90040; (213) 727-1227.* [INQUIRY 209]

IBM color plotters: New plotters from IBM print screen displays on paper or transparencies. Supported by a variety of IBM business graphics software packages, they are compatible with popular spreadsheet programs. IBM 7371 with two pens, $1100; IBM 7372 with six-pen carousel, $1900. *International Business Machines Corp., 1133 Westchester Ave., White Plains, NY 10604; (914) 696-1900.* [INQUIRY 210]

Hi-res graphics: The Kaleido Card features 16-color graphics and a 12- by 11-character display for text. It displays at 320 by 400 or 640 by 400 pixels in the graphics mode. Noninterlaced screen painting eliminates flicker; the package supports Lotus 1-2-3, Symphony, Framework, Microsoft Word, and Flight Simulator, among others. For the IBM PC and compatibles; $595. *IMS International, 2800 Lockheed Way, Carson City, NV 89701; (702) 883-7611.* [INQUIRY 211]

Software

Interactive communications: With PC/Freeway and your Hayes Smartmodem or compatible, you can exchange notes with a friend, contact a database, or transfer files unattended—at rates from 300 to 9600 baud. The package includes a telephone directory, automatic dialing, and an appointment system for setting up future communication. Operates under IBM's TopView. For IBM PC, XT, AT, PCjr, and most compatibles; $99. *SoftCorp, Suite 244, 2340 State Road 580, Clearwater, FL 33575; (813) 799-3984.* [INQUIRY 212]

Versatile networking: The Traverse program links attended and unattended computers and peripherals in a variety of configurations. Utilities include electronic mail, file transfer between unattended computers, remote access, and terminal emulation. For Unix System V, $795; MS-DOS, $295. *Complexx Systems Inc., 4930 Research Dr., Huntsville, AL 35805; (205) 830-4310.* [INQUIRY 213]

Database manager: A powerful, menu-driven system, Data Base Manager integrates with spreadsheets and word processors. It sorts fields by alphabet, numbers, or dates, in ascending or descending order, and performs up to 18 different calculations on numeric fields. The program accommodates 60 characters per field, 40 fields per record, and up to 32,767 records per database. Features include report generation and database reconfiguration. For the IBM PC and compatibles; $199. *Quadram Corp., 4355 International Blvd., Norcross, GA 30093; (404) 923-6666.* [INQUIRY 214]

Presentation graphics: Image produces business graphics, text, freeform drawings, computer-aided designs, or a combination in a single frame. You also can create engineering and architectural drawings. The fast, menu-driven program works with large data sets and accepts input from a keyboard, mouse, digitizer, scanner, or video camera. For the IBM PC with 512K bytes and color graphics card; $995. *Electronic Cottage Inc., 1842 Union St., San Francisco, CA 94123; (415) 931-1867.* [INQUIRY 215]

Paint package: Using circles, ellipses, boxes, pencil, paint can, airbrush, and scissors, you can create professional-quality images and edit them pixel by pixel with Dr. Halo. Captures graphics from all bit-mapped packages, such as Lotus 1-2-3 and AutoCAD. Includes eight font styles. For IBM PC and TI Professional with 256K bytes, graphics card, and pointing device; $99.95. *Media Cybernetics Inc., 7050 Carroll Ave., Takoma Park, MD 20912; (301) 270-0240.* [INQUIRY 216]

Laser printing: Laserstart interfaces the Apple Macintosh to the Hewlett-Packard LaserJet printer. It enhances Macintosh fonts and also makes the LaserJet's 22 typefaces available, printed at up to 300 dots per inch; $95 with cable. *SoftStyle Inc., Suite 205, 7192 Kalanianaole Hwy., Honolulu, HA 96825; (808) 396-6368.* [INQUIRY 217]

File searching: Electra-Find retrieves words, sentences, paragraphs, or blocks of text from ASCII and binary files, single or multiple. It performs Boolean, phonetic, exclusion, or wildcard searches. For IBM PC and compatibles; $65. *O'Neill Software, Suite 1822, 440 Davis Court, San Francisco, CA 94111; (415) 398-2255.* [INQUIRY 218]

File organizer: Diskette Manager II reads and records each disk directory, along with your own comments, and stores information for up to 200 disks on a catalog disk. The program includes a file manager. For IBM PC and compatibles; $89.95. *Lassen Software Inc., POB 1190, Chico, CA 95926; (916) 891-6957.* [INQUIRY 219]

Word processing: Just Write is for users who want MultiMate features in a smaller, simpler package that will run with 128K. It fully uses the function keys for editing and saves to disk automatically after each page of text. A 50,000-word spelling checker is furnished free to registered users. For the IBM PCjr, PC, AT, XT, and compatibles; $245. *Multimate International Corp., 52 Oakland Ave. N., East Hartford, CT 06108; (203) 522-2116.* [INQUIRY 220]

Write 'n Spell: This full-featured word processor consults a 90,000-word dictionary and automatically corrects your misspelled words. Pull-down option windows give one-key access to most functions. The program includes mail and data merge, horizontal scrolling, built-in graphing capability, and the ability to print one document while editing another. For IBM PC, AT, XT, and PCjr, 256K-byte minimum; $149. *Professional Software Inc., 51 Fremont St., Needham, MA 02194; (617) 444-5224.* [INQUIRY 221]

New Products provides up-to-date information on recent releases of microcomputer hardware, software, and accessories. Descriptions are based on information supplied by the manufacturers and should not be considered endorsements. If you need additional information, please check your local dealers or write directly to the manufacturers.

Continued from page 73—

IBM PCs and compatibles.

OneShot lets you display a text file from some other program or computer, including mainframes, and use the cursor to highlight just the information you want to move into your application program. When you've made your selection, you tell the program to convert the data into any one of six file formats. 1-2-3 WKS and Symphony WRK files, a CSV format that can be used by dBASE and other programs, SYLK, straight ASCII text, and DIF files are all supported. OneShot costs $195, and a demonstration disk is available for $10 (DataViz Inc., 16 Winfield Street, Norwalk, CT 06855; (203) 866-4944).

If you own an Apple, two programs from Microsparc, the publisher of *Nibble* magazine, may help. The company's LexiCom program converts Apple Writer I documents into a form usable by any version of Supertext and vice versa. It will also convert either type of file, as well as CP/M files, to Apple DOS 3.3 format. DOS 3.3 random-access files can be converted into sequential-access text files so, as Apple owners know, they can be used by most word processors. LexiCom sells for $50.

TeleText, another MicroSparc product, is a communications program with built-in file-conversion features. It can convert Apple or CP/M Pascal and Applesoft and Integer BASIC files into DOS 3.3 sequential text files. It also can convert binary files into hexadecimal text for transmission to systems that lack a binary file-transfer option. TeleText sells for $80 (MicroSparc Inc., 45 Winthrop St., Concord, MA 01742; (617) 371-1660).

Stand-alone file-translation programs such as these are still relatively rare. However, as the need for translation programs grows, it is likely that one or more master-translator programs will appear in the not-too-distant future. Until that day, you may have to dig a bit to find the specific file-translation program you need.

One particularly good place to look is in the public domain, where programs are frequently written by computer users to solve problems that are not addressed by commercial software. And, best of all, these programs often are free. One example is 123Prep, written by Jon Sims of Evanston, Illinois. 123Prep is a compiled BASIC program that converts an ASCII text file containing fixed-length records into columns for use with 1-2-3's FILE IMPORT NUMBERS command sequence. The program lets you vertically divide your file into fields with numeric values preserved as numbers—something 1-2-3 itself cannot do.

Another example is Dow-to-DIF, written by Frank Patton of Tulsa, Oklahoma. This program converts a file of historical stock data that you've downloaded from Dow Jones News/Retrieval into the DIF format. Once the file is converted, you can load it into any program that supports the DIF format.

Many other useful programs are available in public-domain libraries maintained by user's groups. You can also find some of them in the IBM Communications Forum on CompuServe (GO PCS 131). And you can order them by mail from a number of sources. For example, Dow-to-DIF and associated documentation is on Disk 84 of the collection maintained by the PC Software Interest Group (PC/SIG, Suite J, 1030 East Duane, Sunnyvale, CA 94086; (408) 730-9291). Patton asks a $15 contribution if you find his program valuable. The program 123Prep can be found on Disk 141. The cost per disk is $6, plus $4 per order for shipping and handling. A catalog that lists the more than 300 disks in the collection is $5.95.

STEP THREE:
Creating an ASCII File

In some cases, you simply won't find any options in Program A, Program B, or a third program that perform the transfer and formatting translations you need. But as long as Program B will accept ASCII files, you can almost always import data from Program A by creating an ASCII file. This is the least desirable option because it involves the most work on your part—you have to do most of the file reformatting manually. But it can be done.

First, you must find out what data format the receiving program requires. Check the manual to see if it uses fixed-length or delimited files. If delimiters are required, you also need to know what characters are involved. A good manual will explain these points, usually in a technical reference appendix. If the documentation doesn't contain the information you need, call the software company's customer service number and explain what you want to do.

Next, consider how to generate the file in the required format. And here, the more work you can get the source program to do, the better. As mentioned earlier, dBASE II includes a DELIMITED WITH option to let you specify the delimiting character. Other programs may have a similar feature.

The crucial option many people overlook when creating an ASCII file is a program's capability to print to disk. Software that has this option lets you send information to a disk file formatted just the way it would be if you were printing it. With dBASE, for example, you use the REPORT command to design the desired format. Next you enter the command SET ALTERNATE TO followed by a file name, then SET ALTERNATE ON to tell dBASE to send all information to that file. Finally, you use the REPORT FORM command to effect the actual transfer.

If a program will not let you print to disk, you're still not out of luck. For example, PC/SIG Disk 70 contains a program called VPRINT for "virtual printer." Once you type VPRINT followed by a file name at the DOS prompt, your IBM PC or compatible will send everything that is supposed to go to the printer to that file.

An even more powerful solution for creating ASCII files is offered by SideKick, the popular desk-accessory program from Borland International. With SideKick active, you can move whatever data is on the screen into the notepad. You can use block markers to select just the information you want to transfer. Once the information is in the notepad, you can manipulate and save it as an ASCII file or even export it directly into a different application.

You also can use Desq's Mark and Transfer option to perform an ASCII transfer. With 1-2-3 running in one window, for example, you can mark off the portion of the worksheet you want to move and transfer it to WordStar running in a different window. Desq also lets you take a screenful of data from the source window and move the information into the Desq notepad for formatting before transferring it to the destination window.

Develop a Procedure

Regardless of how it gets there, once the data is stored in an ASCII file you'll often have to massage it into the correct format with your word-processing program before you send it to your target program. This can be a lot of work, but a few tips can make the job easier and the results more satisfactory. First, approach the task with the goal of establishing a procedure. Decide that you're going to methodically investigate the best way to format the file and document what you do. If you're likely to perform the same kind of transfer regularly, taking notes is essential.

If possible, use only a small amount of data to develop your procedure. Instead of trying to deal with an entire database file of 300 records, create a test file containing only 25 or so. Among other things, this will reduce the amount of time a program requires to process the information.

If you don't already own a keyboard macro program, consider getting a product like ProKey (Rosesoft) or Smartkey (Software Research Technologies). These programs let you store a series of keystrokes and execute them by using a single keystroke, thus making it possible to automate many procedures. You can record the various keystrokes on disk and reload them as needed.

Finally, when formatting the file with your word processor, you must consider the kinds of files your word processor generates. If your software, like WordStar, inserts its own high ASCII codes into the text files it processes, the results will not be readable by most application programs. Fortunately, a number of techniques will produce "clean" ASCII files that you can then transfer to the target program.

With WordStar, perhaps the easiest solution is to start the program in the nondocument mode and then bring in your data file. In nondocument mode, word-wrap and other automatic formatting features that insert high codes into the file are automatically turned off. Obviously this means that you will not be able to use the full power of the program.

A better solution might be to prepare the data file using WordStar's document mode, taking advantage of all of the program's power. Then print the file to disk. Because WordStar's print-to-disk option does not clean the file of its high codes, you'll first need to activate a program like VPRINT as described earlier. If you then tell WordStar that you want to print the file, it will remove the high codes as it sends the information to what it thinks is the printer. The same technique will work with other programs as well. (If you have a CP/M computer, you can copy the file using PIP with the Z option.)

A number of programs in the public domain will also strip out the high codes in a WordStar file. Many of these were written because the high codes cause problems when the files are communicated to other computers, but they're equally useful for cleaning a data file before transferring it to another program. (If you subscribe to The Source, you can obtain an excellent public-domain program written by Andrew Fluegelman that converts WordStar files to straight ASCII files. A companion program converts ASCII files to WordStar format. To download these programs, type PARTI, READ "WORDSTAR/ASCII" from any Source "→" prompt. You'll receive full instructions on downloading and using the program.)

You Can Get There from Here

As you can see, moving data from one program or machine to another is no simple matter. But if you spend a few moments looking for the easiest option instead of plunging in without a plan or sense of direction, you'll succeed. □

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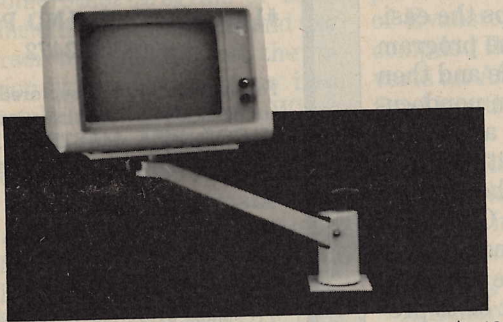

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Archive supplied was below standard. The FasTape 60 can back up 10 megabytes in 3 minutes, but if you want operating system files to be included, you must remember to specify that. You must also remember to rewind the tape if you don't want multiple volumes. Don't change your mind, though—once you've rewound the tape, you're committed to starting from scratch: you can't turn off the overwrite command for the next backup, and there's no way to search for the end of stored data. There are plenty of options for both backup and restoration, but no provision is made for batch-file operation. Archive markets these drives in various ways; if you can get one with better software, you'll have an excellent system. Uses one short expansion card.

■ CIPHER

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■ DAVONG

SYSTEM TAPE *24-megabyte tape backup drive, $1695*

DATASYSTEM *21-megabyte hard disk with 24-megabyte tape backup drive, $3195*

THE SYSTEM TAPE DRIVE MECHANISM IS ALSO FROM Cipher and offers the same 9-minute-per-10-megabyte backup speed. Backup is compressed, so that only the actual data areas are written to tape—saving time and tape space. Unlike Cipher's version, it uses a short, internally installed expansion card (included). The Tape Manager software doesn't allow backup of only modified files or backup by time and date stamp, but it will let you save or restore individual files. The Datasystem combines between 10 and 43 megabytes of hard-disk storage with the tape drive in a single box. Average access time for smaller disks is 100 milliseconds, about the speed of the IBM PC XT's drive. Larger disks average 40 milliseconds.

■ EMULEX

JAVELIN *53-megabyte hard disk with 60-megabyte tape backup drive, $5495*

THE ACCENT HERE IS ON HARD-DISK SPEED—A SIZZLING 30-millisecond access time makes this the fastest drive we've seen. Javelin hard drives come in a range of sizes from 33 to 110 megabytes. The companion tape drive is Cipher's. No-frills backup software creates an image of the XT's disk in a ho-hum 12 minutes, but it can back up 10 megabytes worth of data from its own drive in half the time. The tape software menu offers just disk-to-tape, disk-to-disk, and tape-to-disk total image transfers, with no selection features. Disk-to-disk backup can only be performed if partitions on both disks are the same size and formatted the same way. Javelin requires an empty long expansion slot.

■ **GENIE TECHNOLOGY**

JETSTREAMER *60-megabyte tape backup drive, $1795*

THE GENIE SYSTEM USES THE 3M QIC DRIVE AND BACKS up 10 megabytes in about 5 minutes. It stores one backup on each tape, and its full-featured command set can be used partly from menus and partly from batch files. Both image and file-by-file copies can be created. One option available through the backup menu will appeal to you if you have a lot of data stored on hard disks—you can choose between backing up all partitions or just one in a single operation. If partition sizes change, the data can still be restored. File-by-file commands can't be used through a menu, and new parameters are difficult to enter, lowering the product's ease-of-use rating. It requires a short expansion card.

■ **MAYNARD ELECTRONICS**

MAYNSTREAM *20-megabyte tape backup drive, $1595*

THIS WAS THE ONLY UNIT TESTED THAT USED A DATA cassette similar in size to a sound cassette instead of the larger and more expensive 3M cartridge. It's as fast as the best of the backup units, backing up 10 megabytes in 3 minutes, then providing file-by-file restore. The unit is compact and has a carrying handle. It requires a short expansion slot for installation. The controlling software is not as easy to use as it could be, with three different command sets distributed between two menus and a command-line mode. Parameters must be set in a specific order. Nevertheless, this unit's small size, terrific speed, and reasonable price make it appealing despite its below-average ease-of-use rating.

■ **MOUNTAIN INC.**

FILESAFE *27-megabyte tape backup drive, $1595*

FILESAFE COMBO *20-megabyte hard disk with 27-megabyte tape backup drive, $3495*

FOR OVERALL PERFORMANCE AT A REASONABLE PRICE, this Archive-based system is hard to surpass. It backs up 10 megabytes in just under 5 minutes and uses easy-to-manage menus. The more experienced user can also operate the program with direct commands and from batch files. When using direct commands, you can specify most of the DOS selection options. Mountain gives you more control over the tape than most systems. You can specify whether it should be rewound at the

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end of a backup or left ready to copy more data. If you do rewind and then change your mind, you can still append the next backup to the current files.

■ SYSGEN INC.

SYSGEN XL *60-megabyte tape backup drive, $3295*

THE XL IS A STANDARD DISK AND tape combination unit with a good range of backup commands in both menus and batch files. It uses a 3M drive mechanism and can back up 10 megabytes in 5 minutes. When backing up the whole disk in file-by-file mode, the software is stymied if the selection set includes more than 512 filenames. The XL was easier to install and configure than the other combination hard-disk and tape units we tested but was otherwise quite ordinary. However, this isn't the only product that's cooking at Sysgen. By the time you read this, their Smart line of storage systems will be available. Sysgen promises that these units will do away with limits on the amount of information that can be copied and go a step further—they can be programmed to automatically back up your files at the same time each day.

■ TALLGRASS TECHNOLOGIES

TG-4046 HARDFILE *60-megabyte tape backup drive, $1995*

TG-5025 HARDFILE *25-megabyte hard disk with 60-megabyte tape backup drive, $3495*

THE TALLGRASS UNITS WERE SOMEwhat disappointing. The tape drive takes over an hour and a half to format a tape before it can be used. This needs to be done only once per tape, but it will certainly make initiating a good archival program a chore. Tallgrass, apparently aware of this problem, plans to market formatted cartridges soon. The image backup takes 7 minutes, the slowest time returned by any Archive drive mechanism—partly because of all the tape housekeeping the drive must do before it starts any procedure. A file-by-file backup took half an hour and was limited to file sets containing fewer than 512 filenames. There are no menus, and the DOS-like commands can't be used from batch files. You have more access to individual files on the tape than with some systems, but it's easy to erase tape files accidentally.

■ TANDBERG DATA

DEPUTY *60-megabyte tape backup drive, $1295*

THIS COMPACT UNIT WHIZZED through 10 megabytes in 4 minutes, and its software was very easy to use. The menu-only software doesn't offer many options—just image backup and restore, both of which overwrite all data on the destination drive—but it's honest about what it does. If your archiving routine does not include selective backups anyway, this system won't confuse the issue. It requires one short expansion slot.

■ TECMAR INC.

QIC-60H *60-megabyte tape backup drive, $2144*

QIC-60W20 *20-megabyte hard disk with 60-megabyte tape backup drive, $3495*

TECMAR WAS THE REAL STAR OF this show. Its 3M drive mechanism backed up our 10-megabyte sample in just 3 minutes and had the easiest-to-use and most informative menus tested here. A ten-year-old could safely perform backups with this software. Files are automatically appended to the end of the tape unless you specifically request overwrite, and all backups are cataloged for easy recall. All commands can be entered directly as well and used in batch files. When in direct-command mode, the entire DOS backup option set is available. Besides, this unit is slimmer than most, taking up a third of the desk space required by most drives. It has truly space-age LEDs that let you know what's happening at all times. The screen carries conversational messages like "this tape looks like it's erased." The combination unit unfortunately requires two slots for installation, one short and one long, although only the short card is used for a tape-drive-only installation. ☐

Continued from page 68—

Querying and More

Clout is called a passive program; it will answer your queries but it won't change any data. Several other natural-language programs allow you to change the database or write new programs using natural-language commands. Safeguard Business Systems, for example, sells its Cash Management System to small businesses where computers are common but full-time computer workers are not. Two programs are available, one for accounts payable and one for accounts receivable. The package combines features of a database query system (being able to call up all two-month-overdue accounts, for example) with features like printing out invoices. (The programs run on IBM PCs and compatibles with 128K bytes of RAM; programs cost $395 each if purchased separately or $595 together.)

As with Clout, the user is prompted with open-ended questions on the screen such as "How may I help you?" and "What else can I do for you now?" or requests for more detail such as "What is the vendor name or I.D.?" Liz Willee, a bookkeeper for Charlee McGee Collectibles in Tuckahoe, New York, uses the Safeguard product. "I just type in 'I'd like to add a customer file' or 'I'd like to do a credit memo,' " she says. "I think it's terrific." Willee had never used a computer before.

In a small business where employees often have to cover for each other, a program like Safeguard's is useful because it can recognize that one person's "I want to enter a payment" is another person's "Post cash." In addition, the program's ability to change data as well as retrieve it makes sense because the person asking for information is generally the person creating and changing the information. Separating the tasks would be cumbersome and inefficient.

Natural-Language Programming

Even more ambitious than the programs discussed so far is Savvy from The Savvy Corporation. Savvy itself is a programming language, and as such it can be used to create programs just as other high-level programming languages do. The company sells Savvy PC, a PC-compatible database generator and programming language, in a $295 package that includes Savvy Retriever, which, like Clout, is a passive data-retrieval program.

Unlike most other natural-language products, Savvy reads your requests by matching patterns instead of following linguistic rules. There is no parsing, no syntax, nothing but algorithms that direct a search for similarities between the words that you type and the vocabulary stored in memory.

> **SOME complications could arise, if, for example, Savvy interpreted "Who was hired this week?" as "Who was fired this week?"**

No one at the company is willing to say exactly how Savvy converts a sentence into a value suitable for comparison, but the basic idea is fairly simple: when you type in a sentence, Savvy gives it a numerical score according to the letters and spaces it contains, then looks for a score close to that in memory. The advantage is that, without a need for hundreds or perhaps thousands of rules, the program doesn't take up much disk space—only 4K bytes, according to company spokesman Mike Tulino. The disadvantage is that the pattern matching isn't very useful unless you have already stored a large number of patterns yourself, and that does take memory as well as time. Moreover, the program would be hard-pressed to recognize "copies" as related to "copy," what with three out of six letters unmatched.

When I tried Savvy, it seemed to work as reliably as any of the other English command-driven packages, although I was constantly forced to rephrase my requests. An unacceptable command was met with a polite request to define unknown words with known ones. I browsed through a sample database, then asked a few questions. "Elaine's supervisor?" and "Eliane's sueprvisor?" and "Could you be so kind as to tell me Elaine's supervisor's name?" all yielded the correct answer. "Who supervises Elaine?" did not, for some reason.

Savvy can run in two modes, free and literal. The free mode (in which I searched for Elaine's supervisor) tolerates misspellings and small errors as it looks for the closest match with words in the system's dictionary. This mode is best suited to people who aren't familiar with a particular database and need to resort to educated guesses.

Literal mode means that only an exact match will do, as in a conventional database program. Literal is the way to go if you are familiar with the database and accuracy is critical. Complications could arise, for example, if Savvy interpreted "Who was hired this week?" as "Who was fired this week?"

Savvy's natural-programming language is a definite advantage for business people whose programming skills are secondary to and strictly in the service of their work. Doug York, a lumber broker in Fort Wayne, Indiana, has been using Savvy to write a complicated program for keeping track of lumber inventories. With 20,000 lines of code in his program so far, York wasn't bothered by the amount of vocabulary-building he had to face to get started. He created English-like macros for a number of subroutines and used them instead of writing new code each time. "With this, I'm writing everything in English, so it's easy for me to see what I've done," he says.

The danger in this sort of do-it-yourself language, however, is incipient chaos. Says TI's Harry Tenant, whose doctoral thesis was an evaluation of natural-language systems: "People who don't know anything about grammar and structures will put together a whole hodge-podge. There's a tendency over a period of time to get very arcane wordings." The problem is compounded when several people try to work together.

Is It Really Natural?

Eventually, according to users and vendors alike, people dispense with much of the verbosity that a natural-language system entails. Like the seasoned adventure-game player who evolves from typing "try going north" to "north" to simply "n," the well-practiced natural-language user soon shifts from asking "which projects had the highest expenses?" to barking out "projects expenses top?" "People set up their own codes in the user-defined dictionary," says Wayne Erickson, Microrim's CEO. "'Q1' might mean 'rank the sales force by sales for the following date.'" Not particularly natural, perhaps, but certainly practical.

Probably the best justification for natural-language programs is not that they're natural at all but that they can be used to coax reluctant workers to log onto office computers. Simply put, it's fun to converse with a seemingly intelligent computer. It's not fun to read computer manuals. "Natural language is inherently very appealing," says Richard Weissberg, manager for new business products at Infocom (Cambridge, MA). Infocom is the company that brought natural language into the home with such text-based adventure games as Zork; it was surprising that the company rejected a natural-language query system for its new database manager, Cornerstone.

"It's fun to try to figure out how to communicate with a game. A game is a pastime, and by definition you don't mind passing time playing it," Weissberg points out. "It's fun when the troll is waving a club at you and you have to figure out what to say. But when you're talking to a database, you're not trying to have fun or pass time. You're trying to get your work done accurately and efficiently. When it really comes down to using natural language for business," says Weissberg, "it hasn't come through the way people hoped it would."

Despite major and minor problems and the overeager predictions of years past, no one seems to doubt that natural language will become part of more and more microcomputer software. Harry Tenant talks about an automatic program generator: "You tell the generator what you have in your database, and it will automatically generate a Natural Link interface for you."

Microrim's Wayne Erickson seems content merely to refine the Clout concept, perhaps with an eventual move from database retrieval to database creation and updating. "But with updating, we've got to be careful," he says. "The only way to safeguard data as you manipulate it is to have a lot of confirmation requests from the program—'Is that really what you want?' All those confirmations slow things down, and they take a lot of disk space."

What Lies Ahead

Future natural-language operating systems might let you run several application programs as though they were each pieces of a single, unified program. And we'll continue to see more powerful natural-language interfaces designed for individual application programs. One package scheduled for release this fall is Natpak, from Brodie Associates, an AI software and consulting firm in Boston. Designed for software developers and sophisticated users, this program can be used to generate interfaces for virtually any MS-DOS application program. William Brodie, president of the firm, says that Natpak will offer the ease of use we expect from natural language along with greater flexibility and the capacity to handle more complex queries than current natural-language products.

For the time being, natural-language programs fall short of the ideal. We still have to learn to speak in the limited vocabulary and syntax that the programs recognize—the computer's language, in effect. But as technological advances yield faster processors and the mass storage requisite for a sophisticated vocabulary and grammar, we may yet be communicating with spreadsheets and databases in a more natural way. □

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REACTIONS

A showcase of comments, kudos, outcries, opinions, gripes, and grumblings

Satisfied Customer

I was very interested in your excellent article "Why Not Buy by Mail?" by Brad Hessel and Redmond Simonsen (June 1985, page 22). I have purchased approximately $2000 worth of hardware, peripherals, and software through the mail over the past year and a half and found much of their advice to be very sound.

There is one additional suggestion that I would like to add to their guidelines. After searching through microcomputer magazines and deciding what I want to purchase through the mail, I've adopted the practice of calling the technical support people at the company that manufactures the item of interest. They may possess additional useful information about how the item can be used in your computer system. These calls are a small additional cost to pay when you are spending several hundred dollars.

Also, the manufacturer's technical support people have more up-to-date information. For example, recently I called several mail-order companies about a menu-driven database package. All were willing to sell me the package. I called the manufacturer's technical support number and was told that that software was being recalled because it was not working correctly with computer systems like mine. I called the mail-order house to give them this information and they indicated that they had not been informed that the software was being recalled.

I have ordered from seven or eight different companies and have not been dissatisfied with any of the purchases. The authors of "Why Not Buy by Mail?" are correct: for variety and savings, mail order is the way to go. However, be aware of the pitfalls. —MARC RIEDEL

CARBONDALE, IL

High-Tech Learning

In "A High-Tech Education" (June 1985, page 46) Jerry Pournelle tells us that parents can make effective use of computers in educating their children. The trick is to keep track of what's going on. Well, it would be easier to put pantyhose on an octopus than keep track of educational software. Educational software for the learning disabled is even harder to unearth.

First of all, as owners of an IBM PC, we're discovering that Apple seems to have cornered the school market. The glitzy, widely advertised educational programs don't come in IBM format. There must be a growing number of us Yuppies out here who need IBMs to do our homework who have Yuppettes who want to do their homework on the computer, too. Eventually, someone will catch on that we're a nifty new market.

As the parents of a child with a learning disability, we've begun scouring computer and library journals for educational software references and reviews. We're catching on to the biggies like CBS, but how can we keep track of folks like Sunburst Communications, which Pournelle mentioned in his article?

Problems with reading and spacial relationships are not the only manifestations of "dyslexia." In fact, our son shows superior ability in both areas. His difficulty lies with spelling, arithmetic memorization, hand-eye coordination, and sequential memory. Despite word processing as Pournelle's sanguine solution to poor spelling, the fact remains that he *has* to memorize the whacky English words that can't be spelled phonetically (e.g., "come" not "cum") or he'll be functionally illiterate. The same goes for basic arithmetic.

So someone has to write clever programs for dull stuff like spelling, arithmetic, and memory drill, and we parents need to find out about them. This is a plea for both the software and the communication about its existence. Can you give me any help in tracking down leads on really good educational software formatted for the IBM?

—MARY JANE KELSEY

BRANFORD, CT

There has been a dearth of PC-oriented educational software, but I wouldn't worry about it, since most of what's out there for other machines isn't very good. The situation will change: PCs and compatibles are powerful enough to support some really useful programs. There's no obvious way to keep track of the new software short of reading a lot of magazines.

With the possible exception of Nobel Prizewinner Richard Feynman, everyone I know (including me) has some kind of "learning disability." The trick is to get on with the job of learning despite faulty memory and an inability to draw or do simple arithmetic. It's possible: I managed it, despite schools that had two grades to a room.

You say your son can read, which means that he knows what "come" means. I gather that in writing he tends to spell phonetically. In my book, he's a thousand times better off if he spells it "kum" than the students who spell it with a "g." **—J.P.**

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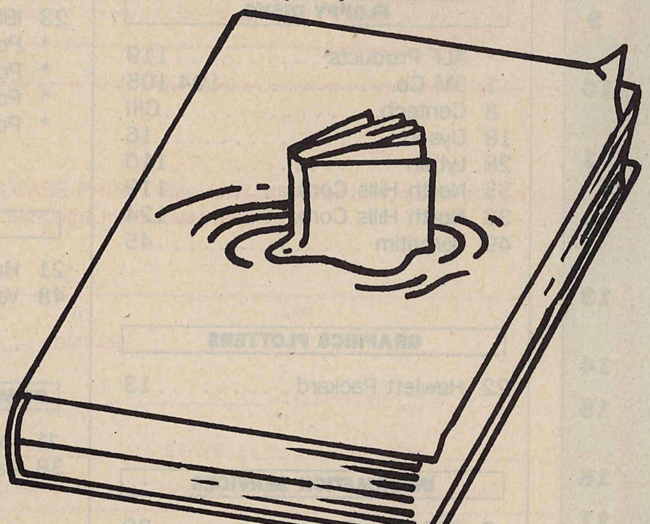
Bookwatching

Changes in microcomputer-book publishing will affect this vital source of information



Unlike hardware and software vendors, booksellers congregate only once a year at a national trade event—the American Booksellers Association show. Some of the quiet, subtle changes behind the hoopla portend that you'll see a narrower range of more vigorously distributed titles by the end of this year.

For the past three years, many well-known general-interest publishers have been trying to get you to read their microcomputer books, but despite a minor success or two, they have all failed. The big-name publishers' collective answer to this intolerable situation, shouted almost in unison at this year's show, is: "If you can't beat them, absorb them." Faced with an inability to sell their own books and book/software packages to "nontraditional book markets" (bookseller's jargon for computer stores), these publishers have either acquired their old competitors or entered into special distribution agreements with them.

Simon & Schuster acquired Prentice-Hall, once the largest publisher of microcomputer books, and, bloated with its new conquest, almost immediately stopped distributing Microsoft Press books. Macmillan bought Howard W. Sams. McGraw-Hill "absorbed" Osborne and simultaneously entered into a distribution agreement with Ashton-Tate. Harper & Row, meanwhile, struck a similar agreement with Microsoft. These sometimes-coerced, sometimes-consenting collaborations will certainly lead to better distribution, but if the acquiring publisher decides to "economize" by trimming editorial staff, you as a consumer will see some not-so-subtle changes for the worse.

Still, some specialized presses that began publishing well-respected microcomputer books years ago remain strong players in today's game; Que Corp. and Compute Publications are two of the best examples. And a new breed of publisher, the book "packager," continues to broker high-quality titles to the highest corporate bidders. The Waite Group is preeminent in this area.

Another trend that may not affect quality but will certainly give marketing a boost is "copublishing," in which a publisher and manufacturer collaborate on a book that eventually bears a joint imprint. Apple's work with Addison-Wesley and Hayden, AT&T's titles in conjunction with Prentice-Hall and Hayden, and Lotus's guides produced by Addison-Wesley are notable examples, and the trend is likely to continue with a string of copublications bearing an IBM imprint.

At any rate, publishers have recognized that application-specific titles are the best sellers. Books on 1-2-3, WordStar, dBASE III, Framework, Symphony, and the like are riding comfortably on the coattails of software marketing efforts. Software developers such as Ashton-Tate and Microsoft have been remarkably successful in following a new software product with the definitive text on its use.

So what does it all mean to you, a reader of microcomputer books? First and foremost, the acquisition/consolidation activities will curtail both the number and the diversity of available microcomputer titles. Large publishers will print only the sure bets.

On the bright side, however, specialty presses and packages will continue to thrive by filling these widening gaps. As manufacturers look for new revenue sources and as smaller book publishers look to trim production costs, copublishing will become commonplace.

Despite better documentation and on-line help facilities, books and magazines remain the most important source of information for getting the most from micros. The dust that's settling in the wake of these publishing industry realignments portends an especially significant bookwatching season.

—Mike Nicita and Ron Petrusha

Mike Nicita and Ron Petrusha cover the latest in microcomputer books every month in *Popular Computing*'s Micro Reviews.

Illustration by Istvan Banyai

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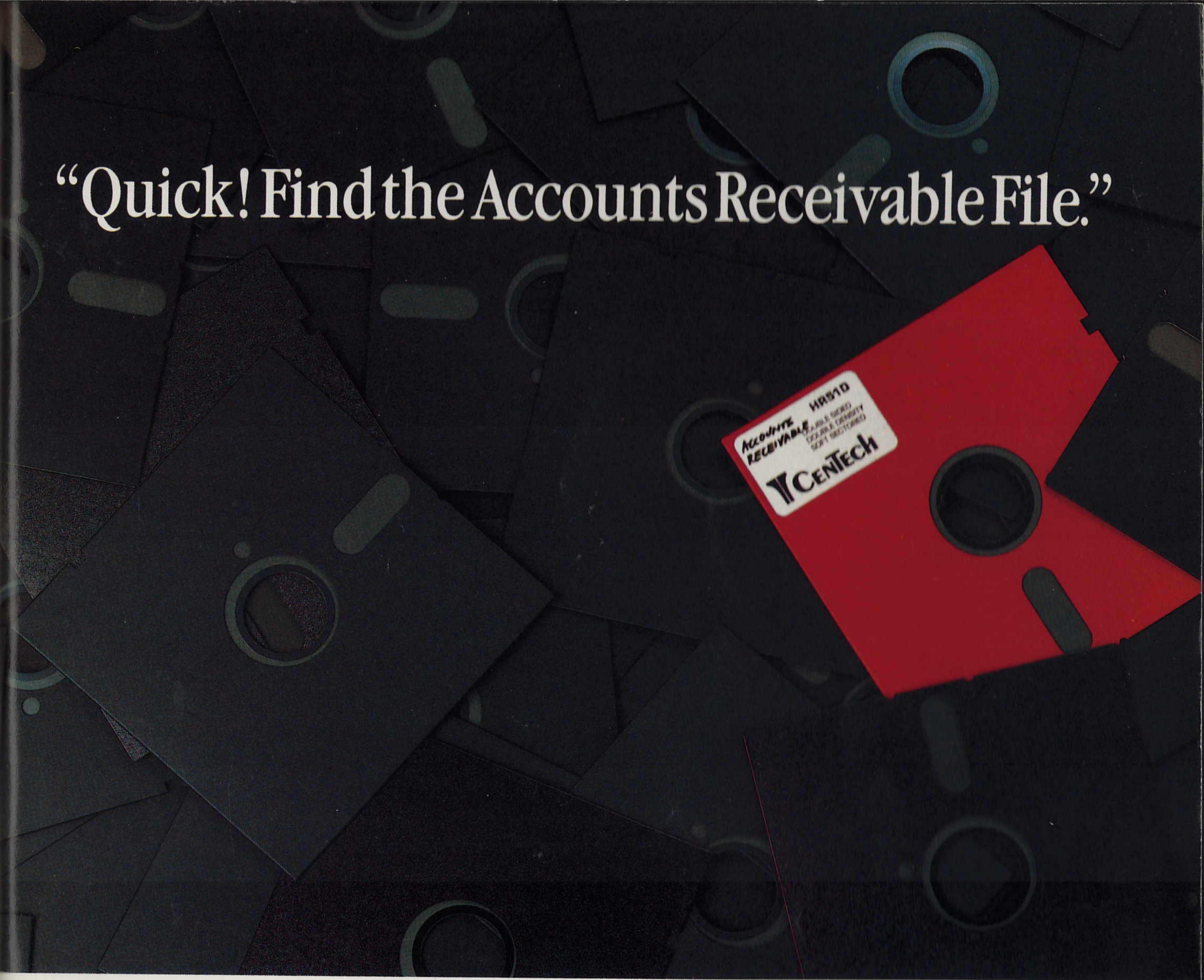

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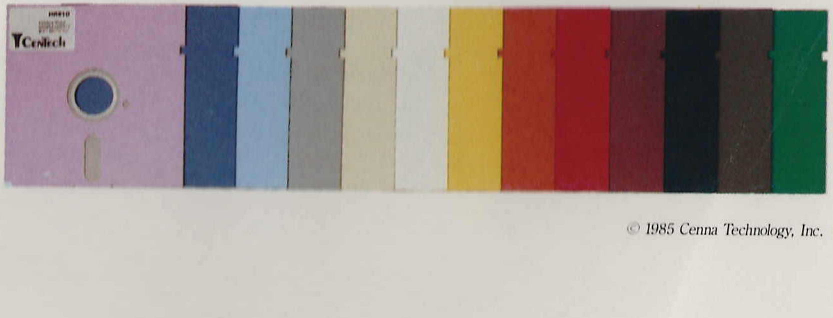

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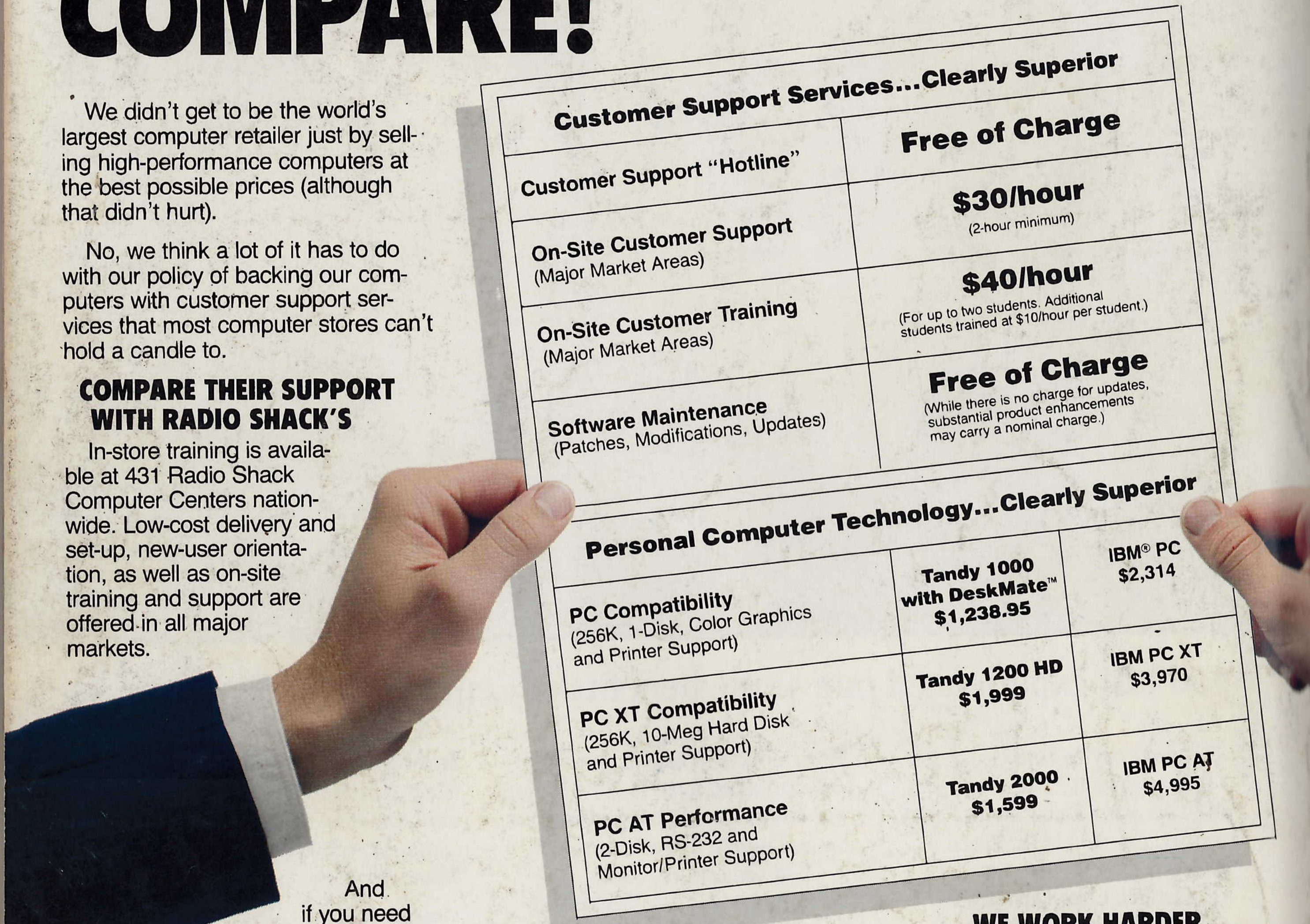

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